THE
VETERINARY RECORD.

The Official Journal of the National Veterinary Medical Association of Great Britain and Ireland, Limited.

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 36. SEPTEMBER 9, 1922. VOL. 2.

National Veterinary Medical Association.

FORTIETH ANNUAL MEETING, BATH, 1922.

President's Address

ON

SALARIES, EDUCATION AND RESEARCH,

BY

O. CHARNOCK BRADLEY, M.D., D.Sc., M.R.C.V.S.,

PRINCIPAL OF THE ROYAL (DICK) VETERINARY COLLEGE, EDINBURGH.

At the end of another year's operations of the re-organised Association, any suspicion that the favourable position twelve months ago was fictitious is entirely removed. Of this, an examination of the Report of the General Secretary ought to convince even those who are most pessimistic by nature. The membership has increased; the Council has settled down to work of a systematic character carried through at meetings held at definite intervals; and the financial position of the Association is good enough to bring a measure of comfort to the Treasurer. No young Association—for the "national" is very young in its present form—could reasonably hope for more. And, while feeling satisfied and justifiably proud of what has been accomplished in a comparatively short time, we shall not forget that we owe it mainly to the loyalty and self-sacrificing devotion and labours of the executive officials of the Association. As the retiring President, I want to say that, with officials of less enthusiasm and more regard for their personal ease, the Association might very easily have died in early infancy. None but those behind the scenes can possibly have more than a faint conception of the disturbing infantile disorders that have demanded the most careful and assiduous nursing. Fortunately, the nurses have been both careful and assiduous, and, despite the gloomy prognosis of physicians who held aloof and apparently feared infection, the infant is doing quite well and growing into a sturdy and promising youngster. Indeed, it may come to pass that the physicians one day will be tempted to claim—not, perhaps, that they were the accoucheurs, but that they were instrumental in preserving the vital spark by the application of Spartan stimulation.

To me it has always seemed that it is a sign of health on the part of an Association and the profession to which it belongs, when the President is confronted by so many suitable topics upon which to base his Address that he is driven into a condition of pitiful indecision. This state of affairs, so ruinous to the desirable mental calm of a President, is a sure indication of the vitality of his Association and his profession; and happily with us it obtains to-day.

By an eliminative process, the secret of which I am not prepared to disclose, I have, however, reduced a multitude of subjects to a trinity—salaries, education and research.

Among the many matters that have engaged the attention of the Council of the Association during the year is that of salaries attached to public appointments. That their consideration was due could be denied by none, and has for long been vigorously advocated by some. In theory, nothing could be easier than to draft a scale of salaries, taking as a guide those paid in connection with equivalent appointments held by members of the medical and other professions. Having done this, there remained, in theory, merely the issue of instructions to members of the Association that appointments advertised as carrying with them salaries below the scale, were to be boycotted. But theoretical simplicity quickly developed into practical complexity. It is by no means easy to draw a close parallel between veterinary and medical public appointments. But even supposing that this could be done, the enforcement of a scale of salaries is yet more difficult. Wherein the main difficulty lies can be most forcibly illustrated by an actual occurrence. It will be in the memory of most, if not all of us, that

recently a certain County Authority advertised for a veterinary official at a salary that few could possibly consider satisfactory in relation to the ability and training desirable in the holder, and the responsibility he would be compelled to bear. Believing that even at the eleventh hour it might be possible to bring reason to those in whose hands the appointment lay, on my own responsibility I wrote to their Clerk, saying that my Association could not regard as adequate the remuneration offered. I received a reply that was just on this side of courtesy, and was told therein, in effect, that whatever the Association might think of the salary, it was evidently quite sufficient, inasmuch as a considerable number of candidates, regarded as suitable, had applied for the appointment.

The socialistic economist to the contrary notwithstanding, the Law of Supply and Demand still holds good, and the relation of price to cost of production is not yet established, at least so far as veterinary appointments are concerned. Nevertheless, there are few of us who will not agree with the view that the salaries of veterinary officials are not, on the whole, commensurate with the specialised character of their work and the responsibility that inevitably attaches to their appointments. And indifferent recompense is not the lot of the junior official only; the senior is not infrequently an equal sufferer. Nor are indifferently good salaries unknown outside municipal and similar appointments. Quite recently, the salary paid to the holder of so high and glorious an appointment as that of the Principalship of one of our veterinary schools, was reported in the public press as having been compared with the income of a fairly prosperous porkbutcher.

> The fact that so many young men and women enter the teaching profession shows that there are still some people willing to scrape along on comparatively little money for the pleasure of following an occupation in which they delight. It is as true to-day as it was in Chaucer's time that there is a class of men who 'gladly learn and gladly teach,' and our college trustees and overseers and rich alumni take advantage of this, and expect them to live on wages which an expert chauffeur would regard as insufficient.—A. EDWARD NEWTON.

"*A Magnificent Farce.*"

At the same time it should not be forgotten that there is a class of appointment where the honorarium—we will not call it a salary—is of far less importance than the opportunities afforded by the appointment. This may be illustrated by an actual instance. Within the last twelve months a certain teaching institution was pilloried for having advertised for a junior—a very junior—member of the staff—a demonstrator, in short—at an honorarium that would possibly have been declined with adjectival scorn by a street-sweeper not very long ago. The appointment, however, was one that on closer examination resolved itself into a free post-graduate course with the addition of a certain amount of pocket-money. In brief, this was a case where the salary was, or ought to have been, a very secondary consideration, and it is mentioned solely for the purpose of showing that the Association, through its Council, must be guided by all the circumstances of an appointment, and the members of the Association may take it for granted that the circumstances are properly investigated.

It has doubtless happened, and will certainly happen again, that the Council, in some matters, *appears* to betray the Association by pursuing a policy of masterly inactivity, when such a policy seems contrary to the interests of the profession. If everything were known, however, it would usually be found that precipitate action would be prejudicial. Occasional inaction, though it may turn out to be wrong, is far less damaging to prestige than action that turns out to be wrong. Indeed, as it seems to me, the most commendable virtue the Council can possess is that of caution informed by enthusiasm. This is all the more desirable so long as the Association enjoys the shining days of youth, and so long as the present state of mental unrest obtains. The Great War has had the effect, not unforseen, of making everyone of us more or less dissatisfied with things as they are, without, at the same time, affording us a clear conception of what it is exactly that we want; and though we are happily past the stage when the blessed word "reconstruction" was on every lip, we are still slightly feverish. We are all, in degrees depending on individual temperament, intensely, almost painfully, anxious to have something better than that which actually exists. A perfectly natural, and even laudable frame of mind, if it is kept in due check by commonsense and adequate knowledge.

It is probably true to say that, than professional education, no single subject, at the present time, produces so much adverse and frequently—I regret to have to say it—unfair criticism. As one who has been actively engaged in teaching veterinary students for thirty years, and as one to whom progress in matters educational has always had an appeal, I have no hesitation in claiming that, taking it all in all, veterinary education has advanced as fast as any reasonable person would demand. This is not to say that there is not ample scope for improvement—it would be the height of foolishness to make any such assertion—but there has been no standing still in the past, and it is safe to assume that there will be none in the future. There *can* be no stasis; for modern thought in education generally—which the more conservative are inclined to regard as reactionary—is bound to have its reflex upon specialised professional education. None need have the smallest fear that veterinary education will escape the forward thrust.

I have said that the criticism levelled at veterinary education is frequently unfair; and, as it seems to me, the unfairness rests mainly in the accusation that the schools fail to produce practitioners with the mental and worldly knowledge that can only come, if it come at all, after years of actual experience of professional life. I am not aware that any school is so ill-advised as to claim that it can produce experienced practitioners. A professional school, of whatever character,

has done its duty when it has laid solid foundations, and has protected the public, so far as may be, against ignorance and charlatanry. And the licensing body has done its duty when it has tested the foundations and made sure that the knowledge of the candidate for the license is not less than the public may reasonably demand. Afterwards the public have it in their own hands to test the efficiency of the candidate for their favours; and it is sometimes a matter for speculation whether the tests applied by the public are not of a milder character than they would be if their application were the duty of the original licensing body.

While indulging what may quite easily seem to be a splenetic mood, but is not, I should like to ask whether the critics of the schools are careful to make themselves familiar with the methods and scope of the teaching as at present obtaining in the various institutions. So far as I can call to mind, no one, during the past ten years, has visited, in a spirit of enquiry, the school with which it is my privilege to be connected. Such visitors, or any visitors, would be warmly welcomed, and every facility would be afforded for the fullest enquiry.

Much has also been said concerning the preliminary general education of the prospective veterinary student, but comment on this subject would probably be unwise at a time when a revised schedule of examinations is awaiting the date of its application. The revised schedule, doubtless quite naturally, does not meet the views of everyone—it would be a marvellous schedule if it did. It is regarded with coolness by two bodies of men. One group predict that it will result in a diminution in the number of students. Time alone will show if this fear is well-grounded. A temporary diminution is almost certain; for no change of a like nature in educational tests is ever without a temporary effect. Others hold that the standard of general education of the veterinary student will still be lower than it should be. These may possibly find some comfort in the thought that the mere passing of an examination is not necessarily a sure indication of mental endowment. The old universities of England managed to turn out men who made their mark on history at a time when educational tests were not particularly severe. Of course, the ideal plan is to abolish the preliminary examination entirely, and admit to our colleges only such students as can be certified as fit to profit by a professional training; the certificate to be given by the boy's highly moral and stringently conscientious headmaster. Unfortunately, humanity is fallible in judgment; a brilliant boy may develop into a very ordinary man; a backward boy may become a very able adult; and —Utopia is not yet. We must struggle on as best we can.

But the subject of professional education and examinations is one that I have been permitted to deal with at a recent Annual Meeting, and it is a subject of so tempting a nature that it might easily lead me to try your patience to breaking point. Let it be enough to emphasise the acknowledged fact that, in education, inspiration is of greater value than the instillation of mere knowledge; and that, in addition, as in everything else, it is well to make sure that change and betterment will go hand in hand. "Prove all things; hold fast to that which is good."

If a correct interpretation of the signs of the times is vouchsafed us, indications are not wanting that the claims of veterinary science, in the future, will receive a fuller meed of recognition than has been theirs in the past. Probably no clearer manifestation of this can be found than the development, during recent years, of the work of the Public Health official. Whatever our individual views may be respecting provisions for the better standard of meat inspection and for the provision of a purer milk supply, the mere fact that these have received public attention must make for hopefulness.

And we may well feel a measure of satisfaction in contemplating the awakening—slow though it be—of the public to the importance of veterinary research. It would ill become me to make laudation of the terms of a recent Report by the Advisory Committee set up by the Development Commission; but I may perhaps be allowed to say that the Report ought to impress upon all who read it the high economic value of research into diseases of animals, and the fact that, in the past, public moneys for the encouragement of veterinary education and research have been doled out in an astonishingly niggardly fashion.

> "It is not possible," the Report says, "to form an estimate of the annual loss from animal disease in the United Kingdom, but it must be very great. The Scottish Animal Diseases Research Association, a body fully representative of stock-owners and herdsmen in Scotland, estimate the annual loss from certain specified diseases in that country at close upon £1,000,000. Your Committee are not in a position to confirm or refute this estimate; they would content themselves with pointing out that the losses in England and Wales are probably four or five times as great as those experienced in Scotland. In the Union of South Africa the value of stock is estimated at £100,000,000 and the annual loss from disease at several millions."

By way of comparison with the small capital and annual sums of public moneys devoted to veterinary research in this country, the Committee report that "the estimated expenditure by the Government of the Union of South Africa upon veterinary education and research, exclusive of building, during the year 1920-21 was £123,447." Of the estimated expenditure, £75,000 was to be spent on laboratories and field research. And in justification of this expenditure, which appears to the investigator in this country to be on a princely scale, attention is drawn to the "admirable contributions made by the Union of South Africa to the study of disease in animals, as illustrating what can be done by the wise expenditure of public funds."

Veterinary research has long enacted the part of Cinderella, and continues to fill the rôle to the apparent entire satisfaction of the Treasury. The Committee conceive it to be their duty

"to state quite clearly what the position is to-day, and in doing so they would call attention to the fact that the provision made by Parliament for the work of the Medical Research Council during the financial year 1921-22 is £130,000, and that the approximate total amount so far recommended by the Development Commissioners in respect of the financial year 1921-22 for the maintenance of agricultural research . . . is £128,000, and for the maintenance of fishery research £39,600. On the other hand recommendations made on behalf of the maintenance of veterinary research (including research scholarships) by the Development Commissioners do not amount to more than about £9,000."

How far veterinary research will benefit by the enquiry conducted by the Committee remains to be seen; but there can be little question that there are good grounds for the conclusion of the Committee to the effect that

"having regard to the position held by the United Kingdom in the stock-breeding world the facilities for research existing in the five veterinary colleges constitute a national disgrace. Veterinary colleges should occupy a position in regard to veterinary research similar to that held by medical schools and hospitals in regard to medical research."

Before leaving the subject of "research," would it be very ungracious to say that there is some danger of the word, when conjoined with the adjective "veterinary," becoming viciously "polarised"—as Oliver Wendell Holmes would have expressed it. It is safe to say that nine out of every ten persons in this room think of "research" as enquiry into the pathological and bacteriological aspects of disease. But are there not other aspects also clamouring for investigation? What about the "third partner" in disease? And is enquiry into the clinical, hygienic, dietetic, physiological and other problems that beset the rational practice of veterinary science on every side, any less necessary than research in the domain of pathology and bacteriology? May it not be possible even that much is still to be learned concerning normal structure? Obviously if we take a comprehensive view, veterinary research offers an enormous field, and satisfying and fruitful results will only be reaped after adequate and appropriate cultivation.

As one who is leaving the Presidential Chair after a long—an unwarrantedly long—occupancy, it may possibly be expected that I should seize the occasion to say, as a valediction, how I regard the Association as it is to-day, and in what direction development may reasonably be anticipated. But, apart altogether from the pitfalls of prophecy, to do this adequately would take too long; and, in any case, I could hardly say more than I have already done more than once. Let it suffice to say that I am more than ever confident that, in the Association, the veterinary profession has the germ of a powerful instrument such as it never had before. The prestige and power of the Association is destined to grow; but the prestige must be jealously guarded, and the power must be judiciously used. Prestige is more readily lost than gained. It is not difficult to earn the reputation of a meddlesome busybody; it is not without much care and a clear anticipatory vision that renown for sanity of judgment is attained. Power is most potent when most reserved.

For its future guidance, perhaps the Association might do worse than adopt the motto of the firm of Rumbelow, Stallybrass and Corker, of Smokeover: "Ideal aims, businesslike methods and sportsmanlike principles." If we conduct it on some such lines, the Association is bound to grow and flourish; and all the more so if we take to ourselves the exhortation that was once directed to certain dwellers in Corinth: "Be perfect, be of good comfort, be of one mind." For "by union the smallest states thrive; by discord the greatest are destroyed."

Annual General Meeting.

The Annual General Meeting of the National Veterinary Medical Association was held in the Guildhall, Bath, on Wednesday, 2nd August, 1922.

The President, Dr. O. C. Bradley occupied the chair, and there were also present:—

Mr. H. Sumner (President Elect); Captain A. W. Noel Pillers (Liverpool); Mr. W. Jackson Young (Edinburgh); Mr. F. T. Harvey (St. Columb); Captain F. C. Scott (Pontefract); Captain J. R. Hewer (Swindon); Mr. W. R. Davis (Enfield); Captain O. V. Gunning (Nonington); Captain Wm. Watt (London); Mr. S. E. Sampson (Sheffield); Mr. J. T. Allen (Tunstall); Mr. W. P. Stableforth (Honiton); Major T. H. Hobson (Leicester); Mr. H. P. Hogben (Folkestone); Captain R. Finch (Preston); Mr. J. Willett (London); Captain H. Tudor Hughes (Oswestry); Mr. M. Robinson (Barnsley); Mr. C. Masson (Torquay); Major G. W. Dunkin (Canterbury); Mr. C. Roberts (Tunbridge Wells); Mr. F. Leeds Gooch (Stamford); Professor J. MacQueen (London); Mr. R. W. Hall (Barry, Glam.); Captain W. F. Widden (London); Professor E. Brayley Reynolds (London); Colonel A. Smith (Seaford); Colonel W. A. Wood (Cambridge); Mr. J. Wright Conchie (Kidderminster); Mr. R. Moore (Treorchy); Mr. G. Howie (Alford, Aberdeen); Mr. W. Brown (Banchory, Aberdeen); Mr. S. H. Slocock (Hounslow); Major F. T. G. Hobday (London); Captain J. R. Barker (Hereford); Mr. C. W. Howard (Dorking); Mr. J. Martin (Wellington, Salop); Major-General Sir Layton J. Blenkinsop; Major C. Hedworth Golledge (Sherborne, Dorset); Captain S. J. Motton (Penzance); Captain J. J. Aveston (Bath); Major F. Chambers (Wolverhampton); Professor R. G. Linton (Edinburgh); Captain P. Abson (Whitefield); Mr. G. H. Livesey (Hove); Mr. Hugh F. Begg (Hamilton, Lanark); Major J. Abson (Sheffield); Mr. G. H. Locke (Manchester); Mr. E. J. Thorburn (Crewkerne); Major G. Rees-Mogg (Wendover); Major T. G. Heatley (Woodbridge); Mr. W. D. Rees (Trealan, Glam.); Captain W. D. John (Ammanford,

Carm.); Major W. N. Wright (Torquay); Mr. G. D. Lansley (Axminster); Mr. M. Bray (King's Lynn); Professor D. Imrie (Glasgow); Captain W. W. Lang (Brigg); Mr. W. L. Richardson (Wadebridge); Captain E. S. Martin (Christchurch, Hants.); Captain A. C. Duncan (Cirencester); Mr. W. Woods (Wigan); Mr. S. W. Pratt (Shanghai); Mr. W. J. Mulvey (London); Captain W. S. Stevens (Wincanton); Major P. J. Simpson (Maidenhead); Captain W. Little (Reading); Captain H. D. Sparrow (Rochford); Mr. E. Collins (Bradford); Captain W. A. Macgregor, Junr. (Ayr); Captain G. A. Roberts (Cullompton); Captain J. Fox (Cardiff); Mr. C. Pitts (Bradford); Mr. H. Apcough Thompson, Junr; Captain S. Villar (Amersham Common); Mr. E. P. Evans (Cardiff); Captain W. A. Williams (Abergavenny); Mr. C. F. Parsons (Cheltenham); Mr. T. J. Brain (Cheltenham); Captain G. Howie, Junr. (Birmingham); Captain W. F. Aston (Ludlow); Mr. J. C. Coleman (Swindon); Captain C. Armstrong (Bristol); Mr. G. Bishop; Captain T. Symes (Yeovil); Mr. A. Veitch (Weston-super-Mare); Mr. C. H. Delacherois (Sandford); Captain W. E. Armstrong (Wigton); Major H. C. Jagger (Buckingham); Mr. W. Roach (Exeter); Captain H. E. Whitemore (West Town); Mr. H. H. Aldred (Chester); Captain W. Kendrick (Tarvin, Cheshire); Captain P. S. Howard (Wanstead); Mr. W. Webster (Warminster); Mr. R. J. Verney (Oxford); Captain E. J. Burndred (Blackburn); Major H. G. Lepper (Aylesbury); Mr. J. L. Perry (Cardiff); Mr. W. T. Edwards (Neath); Mr. G. S. Bruce; Captain P. T. Lindsay (Tamworth); Captain W. R. Williams (Bridgend); Mr. W. Caudwell (Bournemouth); Mr. C. Pack (Lymington); Mr. J. W. H. Masheter (Newnham-on-Severn); Mr. R. Catmur (Abingdon-on-Thames); Captain J. E. Hutchinson (Eccleshall); Mr. J. R. Baxter (Lechlade, Glos.); Mr. J. H. Parker (Faringdon, Berks.); Mr. A. B. Forsyth (Cannock, Staffs.); Mr. F. B. O. Taylor (Redditch); Mr. T. Wilson (Nantwich); Major W. C. Lowe (Cairo); Mr. D. S. Jack (King's Lynn); Mr. D. Pugh (Sevenoaks); Mr. H. C. Gregory (Oswestry); Mr. H. B. Hiles (Worcester); Mr. E. Sayer (Mumbles); Mr. Arnold E. Roberts (Chepstow); Captain E. A. Ryan (Strokestown); Mr. H. L. Roberts (Ipswich); Mr. C.W. Howard (Dorking); Mr. C. E. Perry (Bristol); Captain D. G. Davies (Swansea); Mr. W. Scott (Bridgwater); Mr. E. Whitley Baker (Wimborne); Mr. F. Tonar (Bath); Major F. J. Taylor (Bath); Dr. W. G. Savage (Weston-super-Mare); Mr. G. H. Williams (Chippenham); Captain V. Boyle (Salisbury); and Mr. J. B. Buxton (London), Hon. Secretary.

Visitors:—Mrs. B. Dunkin (Canterbury); Mrs. M. Bailey (Tunbridge Wells); Professor A. W. Whitehouse (Glasgow); Mr. H. Lewellyn-Jones (Denbigh, N. Wales); Mr. J. F. Simpson ("Shirley," Maidenhead); Mr. J. J. Stafford (Westlecot Road, Swindon); Mr. R. W. A. Watchorn (Newtown, N. Wales); Mr. R. Hudson (Retford); Mr. J. W. Procter (Hereford); Dr. G. C. Bevan (Iowa, U.S.A.); Mr. C. B. Perry (Staple Hill, N. Bristol); Mr. A. Sayers, (Swindon); Dr. Jas. F. Blackett, M.O.H. (Guildhall, Bath); Mr. Jas. A. French (Dublin); Mr. A. E. Pett (Bath); Mr. W. Brown, Junr. (Wiveliscombe).

The General SECRETARY read the notice convening the meeting.

The minutes of the last meeting, which have been printed in the *Record*, were ordered to be signed as correct.

Apologies for absence were received from:—Major-General Sir John Moore, Colonel Brittlebank, Major Ascott, Professor Wooldridge, Mr. A. Gofton, Mr. E. L. Butters, Mr. G. P. Male, Mr. J. W. McIntosh, Mr. L. C. Tipper, Mr. T. A. McClintock, Mr. John Cameron, Mr. F. Willett, Mr. Bloye, Mr. W. L. Heelis, Mr. J. Preston and Mr. T. S. Price.

SECRETARY'S REPORT.

The thirty-ninth Annual General Meeting of the Association was held at the Town Hall, Chester, on July 27th, 28th and 29th, 1921, under the Presidency of Dr. O. Charnock Bradley. The proceedings were published in the official Journal and issued to all members.

Dr. O. Charnock Bradley was re-elected President for the year 1921-1922, and the following officers were appointed.

Vice-Presidents—Sir Stewart Stockman, Messrs. W. A. Taylor, A. Watson, A. Gofton.

Treasurer—Professor G. H. Wooldridge.

General Secretary and Editor—Mr. J. B. Buxton.

Assistant Secretary—Mr. Brennan De Vine.

Auditors—Professor Macqueen and Mr. Douglas Wykes, of Messrs. Fairburn, Wingfield and Wykes.

Appointment of additional Assistant Secretary. At a meeting of the Council held on Friday, January 6th, 1922, Mr. H. R. Allen, M.R.C.V.S., was appointed additional Hon. Assistant Secretary.

Resignation of Assistant Secretary.—Mr. Brennan De Vine tendered his resignation as Hon. Assistant Secretary, owing to his inability to continue the work of the advertising department.

COMMITTEES.

Salaries Committee. This committee has held numerous meetings for the purpose of formulating a scale of remuneration for whole-time veterinary inspectors. This scale has been approved by the Council and has been published in *The Veterinary Record.* Other questions concerning the salaries of whole-time officers will be dealt with as, and when, they may arise.

Finance and Advisory Committee. This committee has met at frequent intervals and has carried out on behalf of the Council practically the whole of the business of the Association.

Printing. It was decided to accept the tender of Messrs. Hudson and Son, Birmingham, for the printing of *The Veterinary Record* during the current year. It is anticipated that as a result of various economies, especially the reduction in the cost of paper for the journal, a saving of several hundred pounds will be effected, and so provide the nucleus of a reserve fund.

The Special Committee for consideration of the methods of Distribution of Biological Products has

held several meetings, and will report the results of its deliberations to the Council in due course.

The Special Committee appointed to consider the best means of furnishing information regarding Foreign and Colonial appointments to intending applicants has presented a report to the Council.

COUNCIL.

Number of Meetings. During the year there have been four quarterly meetings of Council.

Resolutions. The following Resolutions have been received and dealt with as follows.

Annual General Meeting, 1921 (Mr. L. W. Wynn Lloyd.)—"That the Ministry of Agriculture be urged to take steps to enforce the Animals (Anæsthetics) Act, the provisions of which, especially in country districts, do not yet appear to be sufficiently appreciated by the police and other ruling bodies."

The Ministry of Agriculture replied pointing out that the enforcement of the provisions of the Act was a matter for the police.

Recommendations of the Special Committee appointed at the Annual General Meeting, Chester, *re* methods of ensuring supervision and control of dairy cows which may be a source of danger to the public, were sent to the National Clean Milk Society, The Ministry of Health, The Ministry of Agriculture, and the authorities of all counties and county boroughs.

Borough of Chelsea.	Concurred.
,, Carlisle.	Representation sent to the Ministry of Agric.; for re-introduction of Tuberculosis Order.
,, Carnarvon.	No action to be taken.
,, Derby.	,, ,,
,, Exeter.	Support the Resolution.
,, Durham.	Partly approved.
,, Essex.	Approved.
,, Fulham.	No action to be taken.
,, Gloucester.	Partly approved.
,, Greenwich.	Partly approved.
Metropolitan Holborn.	Further particulars required.
Borough of Holborn.	In sympathy.
Isle of Wight C. Council.	No instructions given.
Borough of Lambeth.	Received.
County Council, Lincoln.	Approved.
,, ,, Northumberland.	No instructions given.
,, ,, Pembroke.	No action to be taken.
,, ,, Retford.	Approved.
Metropolitan Borough of St. Marylebone.	Letter acknowledged.
Borough Council St. Pancras.	Approved.
Borough of Southwark.	Approved.
County Council, Cornwall.	No action to be taken.
County Council, West Sussex.	No action to be taken.
North Riding of Yorkshire.	No action to be taken.

(8 In agreement. 7 No action to be taken. 3 Partly approve. 3 No instructi ons to be given.)

From the Royal Counties Division. A resolution was received and a small committee has been appointed to enquire into the methods of distribution of biological products for experimental or other purposes.

From the Central Division. "The Council of the Central Veterinary Society request the National Veterinary Medical Association to consider the question of joining the Federation of Medical and Allied Societies."

It was decided to apply for representation, and on March 29th, the Association was elected a corporate member of the Federation. Major F. T. G. Hobday was appointed to represent this Association on the Medical Council of the Federation.

From the Yorkshire Division. "The Yorkshire Division is of the opinion that the time has arrived when, in the interests of public health, the Tuberculosis Order of 1913, should be again brought into force: And request that the National Veterinary Medical Association should take steps to bring the matter before the authorities concerned."

The Secretary was instructed to forward the resolution to the Ministry of Health and the Ministry of Agriculture.

From the Mid-West and South Wales Division. "That this Association urges the Council of the National Veterinary Medical Association to appoint a committee to advise enquirers, especially young graduates, as to the value of salaries offered and their comparative prospects and social position in any part of the world where they may wish to take up a whole-time appointment: Also to make representations to the proper authorities in this country whenever it is considered that the salaries offered are not adequate remuneration as a return for the time and work given to, and the amount of money which has been spent on, the education of a graduate of the veterinary profession."

A special committee was appointed to consider the best methods of carrying out the work and to recommend a standing committee for the purpose of advising applicants for posts abroad. The recommendations of this special committee have been presented to the Council.

MEMBERSHIP.

During the past twelve months the membership has increased from 1,115 to 1,362. There are in addition about 250 subscribers to the official journal. At the time of the last annual report the circulation of *The Veterinary Record* was 1,513 copies weekly. This number has now increased to 1,700, only 60 less than at the time that the paper was acquired by the Association.

Satisfactory as these figures undoubtedly are, it is still urgently necessary that all members of the Association should endeavour to increase the membership by inducing new members to join. It is only by this means that a sufficiently large reserve fund can be obtained to enable the Association to make the grants, etc., provided for in the Articles of Association.

Valuable help can also be given by the prompt payment of all subscriptions which are in arrear.

To date 522 members have failed to pay the subscription for the current year.

The collection of the outstanding amounts causes a considerable amount of unnecessary expense to the Association and worry to the honorary officers.

The CHAIRMAN: The Secretary's report has been received and adopted by the Council, and it is now submitted to the Annual Meeting for your approval. Is it your wish that we should take it paragraph by paragraph? Or shall we take it in *en bloc*? An eminently satisfactory report, as I think everybody will agree. No comments? I think it is better if it were formally moved by somebody.

Mr. YOUNG: I move that it be received and adopted by the members of the Association.

Mr. HARVEY seconded. Carried.

TREASURER'S STATEMENT.

In presenting the Balance Sheet for the year ending December 31st, 1921, together with the Revenue Account and *The Veterinary Record* Production Account, as drawn up by the professional auditor, I would draw attention to the difficulties encountered during the first year's working since the acquisition of the weekly journal by the Association. The complication of the accounts relating to the printing and publication of the *Record*, the monies received and due for advertisements, the sale of copies other than those supplied to members, the cost of office management and furnishing, and numerous other items have made things very difficult indeed for your honorary officials during the past year. It has also increased the labours of the professional auditors, and they have advised and now introduced a system of book-keeping which will make the work very much more easy in future.

It will be seen in the Balance Sheet that at the end of last year we had heavy liabilities amounting to over eight hundred pounds (£800). That consisted of one quarter's printers' accounts and also the heavy legal expenses entailed by the constitution of the Association into a limited liability company. Those accounts are now all paid, and the printers' account is being paid monthly. The Balance Sheet shows an excess of expenditure over income for the year of one hundred and forty-six pounds, seventeen shillings and four pence (£146 17s. 4d.) the broad details of which will be found in the Revenue Account. Amongst the items of expenditure will be seen one for one hundred and forty-five pounds, eleven shillings and four pence (£145 11s. 4d.) for preliminary expenses, a non-recurring item which practically accounts for all the excess.

On referring to *The Veterinary Record* production account, I feel sure that most members will be surprised at the large amount of money (over £3 500) we have had to find in order to meet the costs. It has needed every care and economy, and the most careful consideration of every expense incurred, before the way could be seen clear at the end of the year. In this account, too, is seen an item of two hundred pounds (£200) which had to be refunded in numerous small amounts to various members who paid Messrs. Brown for advance copies of the *Record*—which is, of course, now supplied free of charge to members of the Association. The revenue from advertisements has been considerable, and for this the thanks of the Association are due to Major W. B. De Vine who was in close local touch with the printers. The advertisement management has now been brought to the central office, and, good as has been the revenue from this source, it is hoped to still further increase it during the present year.

In summing up, I feel that the Association is to be congratulated on the state of its finances, which I personally regard as satisfactory, particularly when we consider that it is the first year of the ownership of the *Record*, with the heavy and unavoidable preliminary expenses, and the very high cost of printing and postage. If I may be permitted to look ahead, I feel every confidence in forecasting that the present year will be financially a very satisfactory one, and I look forward to an even more favourable balance sheet for 1922.

(Signed) GEO. H. WOOLDRIDGE.

National Veterinary Medical Association.

BALANCE SHEET.

LIABILITIES.

	£ s. d.	£ s. d.
CAPITAL:		
The Company has not a Share Capital, the liability of members being limited by Guarantee.		
Sundry Creditors		826 14 4
No. 2 Bank A/c overdrawn ...	2 14 2	
Petty Cash „ „ ...	0 3 11	
		2 18 1
Subsciptions paid in advance ...		32 0 6
RESERVE ACCOUNT:		
Balance at 31st Dec., 1920 ...	512 10 2	
Less Excess of Expenditure over Income for year	146 17 4	
		365 12 10
		£1,227 5 9

ASSETS.

	£ s. d.	£ s. d.
Cash at Bank	97 19 10	
Cash at Bank, Petty Cash A/c ...	15 3 6	
Cash in Hand	16 6 0	
		129 9 4
Cash on Deposit		150 0 0
Sundry Debtors for Advertisements		447 16 5
Goodwill and Copyrights in the "Veterinary Record" at cost		500 0 0
		£1,227 5 9

Revenue Account.

Dr. Expenditure.	£	s.	d.
To Office Salaries and General Office Expenditure	539	14	0
Secretarial Expenses	81	7	2
Expenses of Reporting Proceedings at Meetings	163	1	8
Rent	65	0	0
District Offices Expenses	21	0	2
Telephone	6	0	11
Lighting	5	1	4
Stationery	53	12	5
Legal and Professional Charges	46	11	10
Subscriptions to the Royal Sanitary Institute	1	11	6
Bank Charges	0	3	1
Preliminary Expenses	145	11	4
Balance from "Veterinary Record" Production Account	1,858	9	1
	£2,987	4	6

Income. Cr.	£	s.	d.
By Subscriptions	2,836	15	9
„ Deposit Interest	3	11	5
„ Deficiency for year carried to Balance Sheet	146	17	4
	£2,987	4	6

"Record" Production Account.

Dr.	£	s.	d.
To Cost of Printing and Publishing	2,871	1	6
„ Cost of Distribution, Postages, etc.	363	16	4
„ Press Cuttings	8	8	0
„ Law Costs	13	2	0
„ Advertisement Manager's Expenses	16	17	0
„ General Office Expenses	40	8	7
„ Cheque Books	2	0	0
„ Amount returned to Members in respect of Subscriptions paid before purchase of Goodwill and Copyrights	200	14	2
	£3,516	7	7

Cr.	£	s.	d.
By Sales to the Public	448	5	9
„ Advertisement Revenue	1,209	12	9
„ Balance carried to Revenue A/c	1,858	9	1
	£3,516	7	7

O. Charnock Bradley, *President.*
Geo. H. Wooldridge, *Hon. Treasurer.*
J. Basil Buxton, *General Secretary.*

We have audited the Balance Sheet of the National Veterinary Medical Association of Great Britain and Ireland, Limited, dated 31st December, 1921, and we have obtained all the information and explanations we have required. In our opinion the above Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Association's affairs according to the best of our information and the explanations given to us and as shown by the books of the Association.

Fairbairn, Wingfield & Wykes,
Chartered Accountants.

18*th July*, 1922.

The Chairman: Unfortunately the Treasurer was not able to do more than submit it to us last night, and then leave for London. I do not think there is very much it would have been necessary for him to have said, but if there are any difficulties it may be that the General Secretary or myself can clear them up. Does anyone desire any information on the Treasurer's Statement? Will somebody then move that it be received and adopted?

Mr. W. Davies: I beg to move it be received and adopted.

Mr. Watt: I second. Carried.

Election of Officers.

The Chairman: We now proceed to the election of officers. I can tell you of the names of those suggested by your Council, and it will be for you to adopt these suggestions or make other suggestions if you think fit. The Council's suggestion for the new President is the name of Mr. Henry Sumner. I am quite sure I need not put that to you. I may take it as meeting with your unanimous views. (Applause.)

As Vice-Presidents it is suggested that the Presidents of the four branches should be elected. This is really according to custom, and I think on the whole it is a desirable custom. I will put that to you. (Agreed.)

As far as the Treasurer is concerned, the Council determined that there is only one thing that could possibly be done. That was to ask Professor Wooldridge if he would be good enough to take office again for another year. He agreed to nomination, and it is for you to say if you accept it. (Agreed.) Perhaps, however, we will have a formal resolution.

Mr. Gooch: I propose it.

Mr. Robinson seconded. Carried.

The Chairman: The Council were just as equal minded, if not more strongly minded, if that is possible, as to the General Secretary, and we suggest you appoint Mr. Buxton as General Secretary. (Applause). I would like to have it formally proposed.

Mr. Willett: I propose it.

Mr. W. E. Davis seconded.

Carried with acclamation.

The CHAIRMAN: Now there is the Assistant Secretary. It was felt that the views of the General Secretary should be taken into account. Of course he is the person particularly concerned; and the General Secretary suggests we should re-appoint Mr. Allen as Assistant Secretary. The Council saw no reason whatsoever why he should not be re-appointed, so Mr. Allen's name comes before you. Is it agreed with your approval? (Agreed.)

In case of the Auditors, I suppose—although it is open to you to make any change—that you would wish to appoint the auditors of last year again. (Agreed.)

To Determine Place of Next Annual General Meeting.

The CHAIRMAN: We have now to determine the place of the next Annual General Meeting—a matter that should receive a due amount of thought, because the success of the meeting very largely depends upon where it happens to take place. A suggestion that I want to make to this meeting is that we should make a practice of having the Annual Meeting in some town or other in one of the branches. In 1920 the meeting was held in the Scottish branch; in 1921 the meeting should have been held, and to all intents and purposes was held in the Irish branch, although actually in the town of Chester, but for the moment that was considered part of the Irish branch. This year, meeting in Bath as we do, we say we have met in the territory of the Southern branch, so it seems if this suggestion is followed quite naturally, we should meet next year in some town in the territory of the Northern. There were two or three towns suggested. No decision was arrived at. One was Scarborough, another Norwich. Yarmouth was also mentioned. It has also occurred to some of us there is another town that should receive attention, namely, York, and largely for this reason. Scarborough or Yarmouth in August are going to be crowded, and we had to ask ourselves whether hotels might not be reluctant to make provision for the accommodation of 150 or 200. Some inconvenience might be experienced at a seaside resort, in view of their extra social functions. Norwich would not have that drawback, but it might have the disadvantage of having small attractions for ladies. I may say we certainly do not want to do without ladies at the Annual Meeting. York would provide all the accommodation that was necessary, and would be a very excellent centre for excursions. I am putting York forward very largely on my own responsibility. I have to put to you the names suggested by the Council of Norwich and Scarborough. It is open to you to suggest or decide upon any other town. I put these three really as suggestions. Don't let us come to a decision rashly. It is an extremely important piece of business we are going to transact which may make or mar next year's meeting.

Mr. F. L. GOOCH: I shall stick up for Norwich. There is no better centre for the ladies. They can get to the Broads in twenty minutes, to Cromer in half-an-hour, and to Yarmouth in less than an hour. There are other attractions. Norwich itself is very historical. I shall propose that the next Annual Meeting be held at Norwich.

Mr. S. E. SAMPSON: I should like to propose York.

Mr. GOOCH: One consideration why Norwich was suggested is the large number of scattered practitioners in the Eastern Counties.

Mr. J. WILLETT: I will second Norwich.

Mr. F. C. SCOTT (Pontefract) seconded York.

The CHAIRMAN: I am going to put these two places. I am going to put Norwich first.

Sixteen voted for Norwich and eighteen for York.

The CHAIRMAN: The next business that comes under the heading of "any other business" is to receive the resolution that comes from the central division that has been transmitted from the Council to the Annual General Meeting.

The SECRETARY read the resolution as follows:—

"The Central Branch of the National Veterinary Association recommends the following resolution for the consideration of the N.V.M.A.

"As there is a great diversity of opinion on the question of the humane slaughtering of animals intended for human food, and the subsequent effect on the flesh of the various methods used, we suggest that a Government Committee of Inquiry be instituted to investigate the whole subject; the Committee to consist of members of all professions and trades interested."

The CHAIRMAN: You had better discuss this before you come to any decision.

Major HOBDAY: I should like to speak very strongly on this. At the Central Meeting it was felt there is a crying need at the present moment for this to be settled one way or the other. The time is ripe for it. During the past week the daily press has had some very striking articles on the subject. It is a pity we, as veterinary surgeons, have not been right in the fore-front of the discussion. It is largely owing to the work of members of our profession that there is this dispute at the present time.

General Sir L. BLENKINSOP: I would like to read an extract from the *Daily Mail* this morning of a letter from the Secretary of the Association of London Retail Meat Traders. He says:—

"With regard to the mechanical killer, the meat trade takes up this strong and unanswerable position, namely, that an inquiry must be held by the Government into the whole question of the use of mechanical implements in slaughtering.

"All reliable scientific opinion is, however, on the side of the pole-axe for slaughtering animals intended for food, and there is also ample evidence, from the men's point of view, that they consider the mechanical slaughtering implement to be dangerous."

There is no doubt this question of the slaughtering of animals is now agitating the public, and it is proper that the veterinary profession should consider it. Owing to the delay between Council Meetings, the resolutions would have probably already been before

the public. I suggest that not only this resolution be acted upon, but that some letter from this National Association should be sent to the public press showing what we have done in the matter.

Major HOBDAY quoted a further press statement.

Mr. HUGH BEGG: The Duchess of Hamilton set the ball rolling; she sent the first letter to the press. This question always appeals to me in this way. As soon as we have produced a method of humane killing, which shall be as free from danger as is the pole-axe, then I would be all in favour of it. I have seen bullets flying round, and I have seen others used which have done uncommonly well. I am wholeheartedly in favour of some kind of investigation being made; and the veterinary profession ought to lead the way. I agreed with Sir Layton Blenkinsop that a resolution should be sent to the press indicating to the public our feelings in the matter. Such propaganda as that ought to be done to-day. I know the view of killers who are experts with a pole-axe is that nothing has ever turned up yet which is quite so good. If a man is ever to be killed through the weakness of the humane killer, they should not be used.

Professor MACQUEEN: Is it the intention that this Association should commit itself to any special method of slaughtering?

The CHAIRMAN: "No."

Professor MACQUEEN: It seems to me an initial difficulty for us to consider. We are not very much concerned with the slaughtering of animals, but in preserving animals. We are not out to kill; we are out to save life; and when one comes to the actual question of slaughtering for food, opinions are bound to differ very considerably owing to the state of the animals submitted to the slaughterman; and owing to the removal of the Canadian embargo, it is quite likely that the slaughtering of these animals will have to be carried out in a different manner to the slaughtering of home-bred animals. My own feeling is that it is not a subject with which this Association is particularly concerned. All that is required is a mere expression of opinion as to the most humane method of slaughtering. That is a matter for individual consideration. I do not think that the Association is competent to say which is the most humane method of slaughtering animals for human food. We took no part in the production of the humane killer, which was introduced independent of the veterinary profession; and it is more than thirty-five years ago that an investigation was carried out in the slaughter-house for the purpose of ascertaining whether or not the pole-axe was a humane method of slaughtering.

The matter is unsettled at the present moment; and there is no possibility, so far as I can see, of arriving at a definite conclusion.

The CHAIRMAN: Let me read the resolution again. I want you to grasp its significance. Although we ask that a Committee of inquiry may be instituted to investigate the whole subject, we are not expressing any opinion.

Major HOBDAY: I wish to point out that the resolution was sent to the Association out of loyalty by one of the Societies for the parent body; and we want the support of the main Society. Instead of sending it straight from the Central, we desired the backing of the whole representative body of the profession. A similar resolution is being brought forward at the Sanitary Congress at Bournemouth. The need was felt of an instrument that should be as humane as the pole-axe proficiently used, an instrument absolutely humane and absolutely safe.

Mr. GOOCH: When we know there is a very decided controversy between men who supply food as to the condition of meat after slaughter and its keeping qualities, it is for us as a scientific body to be in the forefront of the matter. I have seen an animal shot three times and not knocked down, and accidents even in the public streets, where a bullet went through a window just above a man's head.

Mr. J. J. AVESTON: We should take a lead in sending this resolution forward, because public opinion is at the present moment seriously alarmed, and nowhere more so than in the City of Bath, where the mayor is most keenly interested in this question, and the City Council recently received a deputation on the subject. I feel not the slightest hesitation in saying that an animal properly pole-axed has no suffering whatever. I visit many slaughter-houses. There is probably one man there who can pole-axe an animal. His deputy is an inferior slaughterman. If the former falls ill, how do they get over the difficulty? They can perhaps get no one else, so the deputy is told "You must do it yourself." This man may be absolutely incapable of dealing with animals. Then they got awful sights. I have seen some of them. I have been asked dozens of times lately if I can tell people the name of a butcher who used an humane killer. If one butcher put up a notice in the city that he killed animals by the humane method, there is no doubt his trade would increase 500 per cent. Public opinion has the matter largely in its own hands; but what we feel in Bath is that a public abattoir would settle that question to a large extent. At the same time I earnestly ask that this resolution shall go forward, because I am convinced that nothing but good will come of its being sent to the proper quarter.

Mr. HUGHES: I support the motion because I am in favour of getting uniformity throughout the country. Veterinary surgeons should certainly have a voice in the way that meat is produced.

Professor E. B. REYNOLDS: I submit that is the only point upon which the recommendation should be sent forward. A Government enquiry should be instituted to decide once and for all, not only as to the humane method of killing animals, but also in connection with the effect of the various methods of killing on the keeping qualities of the food. The very diverse opinions expressed show how very little we know on this point. If only to settle all these questions, and not really to express any opinion from

this Association as to any particular method, I support the motion.

Mr. HALL: I do not agree with the view of Professor MacQueen. We are concerned with meat inspection. Surely we should take a humanitarian view. We ought to be leaders in showing we have some feeling towards the animals we have in our charge. On that account I support it.

A MEMBER: I move that the question be now put.

The CHAIRMAN: I should like someone to move in terms of the resolution of the Central division, and in the motion suggesting what is to be done with the resolution when it passes our hands. There is no suggestion in the resolution sent from the Central as to what should be done as to that, or as to what steps should be taken in endeavouring to obtain a Government enquiry. I should very much like a formal resolution that I can put to you.

Mr. J. ABSON: Are we to ignore the Jewish method of slaughter?

The CHAIRMAN: It includes all methods of slaughtering.

Major HOBDAY: I move the resolution, and that it be sent to the Ministry of Health, the Council of the Royal College of Veterinary Surgeons, the Ministry of Agriculture and Fisheries, the Board of Agriculture for Scotland, and the Board of Agriculture and Technical Institute of Ireland.

Mr. LIVESEY seconded.

Mr. J. WILLETT: What about the public press? It is a burning question.

A MEMBER: May I suggest we send it to the Farmers' Union as well?

The CHAIRMAN: Why not the Meat Trades Federation as well? We are broad-casting this. We can add names and various *addenda* afterwards. Let us get the clean cut resolution passed first. The resolution was then passed.

The CHAIRMAN: Mr. Willett suggests that this resolution having been accepted by the Association be communicated to the public press. (Agreed.) There is a further suggestion—that we ask, in submitting the resolution to these various bodies, for their active co-operation and support.

Mr. GOOCH: Leave it to the General Secretary and the President to draw up a covering letter to be sent with the resolution to these different bodies. (Agreed.)

The CHAIRMAN: Is there anything further in the shape of any other business?

Professor MACQUEEN: I suppose it is too late to say anything regarding the Annual Report.

The CHAIRMAN: Too late now.

Professor MACQUEEN: I was there at 9-20 a.m., and you were on the eighth item of the agenda. If you will give me permission, I should like to call attention to one omission in the annual report, and you will tell me whether I am in order or not. I think it is remarkable that an Association of this kind has passed in silence the present opposition to the application of the Royal College of Veterinary Surgeons for a new charter. It must be within the knowledge of a good many here that that application is now opposed by certain universities, and I think that this Association, as it now numbers the vast majority of the profession, should have stated in a definite way whether or not they are in favour of maintaining the one portal system of entering into the profession. I have no proposal to make. I only wish to call the attention of the Association, and particularly of the executive of the Association, to that omission, which I think a most unfortunate one; that at this particular time—one might almost say a crisis, in the governing body of the profession—no mention has been made, no resolution has been proposed to support the action of the Royal College of Veterinary Surgeons at the present juncture.

The CHAIRMAN: Can we express an opinion as a body?

Mr. WILLETT: I quite agree with Professor MacQueen's remarks. It would help the Royal College to support them in their desire to get a new charter. It is rather difficult to suggest something. It requires a little thought first. I think some resolution should go to the Royal College.

The CHAIRMAN: When we have our closing meeting at 4 o'clock to-morrow, if it is desirable a resolution can be submitted. We can accept a resolution at the closing meeting.

The President then gave his address.

A verbatim report of Dr. O. C. Bradley's Address appears elsewhere.

THE MAYOR'S WELCOME.

At this point the Mayor of Bath (Alderman E. J. White) entered the room, accompanied by the local secretary, Mr. J. J. Aveston.

Mr. AVESTON: I have with very great pleasure the privilege of introducing you to the Mayor of Bath. He is a real good friend to the profession. I have known him many years. I have been upon occasions both a friendly and a hostile witness in a Court of Law, but I have always been treated as a gentleman. He is an example to other advocates in this and other towns. I must apologise to Your Worship for the smallness of the attendance. The charms of Bath have kept some of the members away. On behalf of the Association I have much pleasure in inviting the Lady Mayoress and Miss White to be present at the Annual Dinner to-morrow night. I assure you they will receive a hearty welcome.

The MAYOR said: I am much obliged to you (Mr. Aveston) for your kindly words of introduction, and it is a very great pleasure to me to welcome your Association to the city of Bath. I am not surprised that the attractions of this city prove greater than the attraction of a welcome from the Mayor of the city, especially to the ladies. I am glad to know that you have ladies amongst your gathering. I hope you have them also in your profession. (Laughter.) I have heard of lady veterinary surgeons, and I think I came across one once at Folkestone; she was like my friend Mr. Aveston, extremely clever with dogs.

It has been said that the proper study of mankind is man, but I am one of those who hold that the proper

study of four-footed animals is of very great importance. It is, of couse, appropriate that a conference of veterinary surgeons should take place in the "dog days" (laughter), but whether that be so or not, we are very glad indeed to welcome you to this city. The study of animals can, I think, only be properly undertaken by lovers of animals, and I have seldom come across a veterinary surgeon who was not a keen lover of four-footed animals.

You are met to consider matters concerning your profession, and it is not for me to say much about your profession. I know very little of it, and I have never practised it except during the days when they were organising for the South African War in 1900, when I did lend a good many hours to my friend, Mr. Golledge, of Trowbridge, in looking after sick horses.

In comparing veterinary surgeons with ordinary medical men, I always think that the veterinary surgeon is placed at a great disadvantage, because whilst men and women may have fancy complaints and put up all sorts of tales to the doctors, unfortunately animals cannot have fancy complaints, and, if they could, they could not even tell them about them. It is impossible, therefore, very often at first for a veterinary surgeon to tell what really is the matter with his patient, and whether it is genuinely sick or not, although my experience is that veterinary surgeons have a most uncanny way of finding out whether a dog or horse is shamming, or really ill.

Now, as Mr. Aveston said, in the course of my professional work I have met many veterinary surgeons, and I am bound to say they have one and all earned my regard and respect, whether they were for me or against me. I always think, however, that comparing the lawyer and the ordinary medical man with the veterinary surgeon, the first two are very well paid as a rule by Benches of Magistrates, but the veterinary surgeon is very badly paid. For some reason or other it seems to have got into the heads of Benches—I do not know why they should refer to magistrates by that wooden appellation (laughter)—that veterinary surgeons ought to be satisfied with any old fee that they choose to give them. I am not so sure, though. I think it requires as high a training for a veterinary surgeon as for any other branch of medical science. The comparative studies are, I think, equally strenuous, and certainly the difficulties in cases of animals are infinitely greater in many instances than those of human beings. It requires, certainly, a high standard for both, and I think that both should be recognised—or all three recognised, because I include the poor lawyers as well (laughter)—by the payment of respectable fees.

Fortunately you are favoured with fine weather for your visit to the city of Bath, and before you return I am sure you will be satisfied that you could not have come to a more beautiful city. We claim that Bath is the most beautiful city in England. Lord Rosebery was good enough to say on one occasion in another room in this building that in his opinion Bath was the most beautiful city in Europe. From the travelling experience I have had I think I can confirm what he said. But Bath, apart from its beauties, contains waters of wonderful curative virtues. I see no reason myself whatever why the use of the Bath mineral waters should not be extended to the patients which are attended by your profession. I am one of those who believe that the Bath City Council should provide a really good bath for horses and other animals who need the mineral waters. Of course you may smile, but it is no smiling matter. Certainly if the mineral waters of Bath will cure gout and rheumatism in people who come on crutches and go away skipping, they should be able to do something for horses, because horses suffer very much from rheumatism. I am not altogether sure that drinking the Bath waters would not do. If horses could be induced to drink the water, I am not sure that that would not be beneficial also. There are spas in this country where the waters are so unpalatable that people pay 2d. for a glass, and they are anxious to pay 4d. for a glass of something else to take away the taste. (Laughter.) Bath waters are certainly not so unpalatable as the waters you get in other places, and I believe you could induce animals to drink them.

All I have to do is again to welcome you, and to commend the ladies and gentlemen engaged in the veterinary profession to remember the dignity of that profession, to urge you to attach yourselves to all that is highest in your professional work, and whilst I am prepared at all times to give the fullest possible credit to members of the veterinary profession for their kindness to animals and doing their duty in regard to cruelty cases, I would urge you, if I may be allowed to do so, to kill any idea that a veterinary surgeon will lend himself to bolster up cruelty to animals. I urge you point blank to refuse to help wilful sinners in such cases. Do not encourage or palliate suffering caused by home treatment, except such as can be given until the veterinary surgeon arrives. It is thought that any fool can treat a dumb animal. Well, my opinion is that that is a great mistake. If veterinary surgeons declined to defend owners in cruelty cases, I believe that owners would more frequently consult veterinary surgeons and call them in when anything wrong was suspected, instead of going on until they got into the police court and needed to be defended by some specialist's opinion. You want to make owners feel the necessity of calling in the doctor. There would be less suffering to dumb animals, and more profits to the veterinary surgeon. As I say, one desires to give every credit to veterinary surgeons, and I hope you won't think for one moment that I am lecturing you, but I honestly believe that if veterinary surgeons saw to it that they declined to help people who got into trouble in cruelty cases, they would be called in, and there would be a lesser number of cruelty cases through the action which they have taken.

There is only one other point, sir, that I would like to mention, with your permission, and that is with regard to the humane killer. Your Association is a powerful one; it is capable of doing great work

throughout the country, and I am interested to the extent that I would fain lessen pain that any dumb animal has to experience. I am, therefore, concerned to ask you to use your influence to bring into operation and into general use the humane killer, instead of the present system of slaughtering animals. It is a matter which I think largely depends upon the influence and efforts, collectively and individually, of this Association. I venture to ask that you will use that influence both collectively and individually to bring about a general use of the humane killer.

We are told in Bath by the Butchers' Association that they will welcome the use of the humane killer, provided they can obtain one that is not a dangerous instrument. (Applause.) I am glad to know that they are so willing. All we have to do is to convince them that the instruments which are in existence are not dangerous, and I am sure that nobody will be more willing to help in that direction than Mr. Aveston and his colleagues who work in the city of Bath. I hope that other gentlemen living in other cities will use their influence in the same direction.

I bid you a very hearty welcome to the city. I hope you will have a very enjoyable time, and that you will go away from the city filled with its praises, and with a desire to come again for the first holiday you have. (Applause.)

After the retirement of the Mayor the Conference proceeded to the consideration of Mr. F. T. Harvey's paper on "Bovine Mastitis."

[Mr. Harvey's paper, together with the ensuing discussion, are given elsewhere in this issue.—ED.]

The Conference Papers.

We publish in the present number the paper on "Bovine Mastitis," by F. T. Harvey, which was delivered to the Conference on Wednesday morning, August 2nd.

Future numbers of the *Record* will contain the following papers, together with discussions thereupon:—"Hernia," by Professor E. Brayley Reynolds, O.B.E., M.R.C.V.S., delivered in the morning of Thursday, August 3rd. "The Veterinary Profession and a Pure Milk Supply," by Sidney Villar, F.R.C.V.S., read at the opening of the afternoon session of the same day, and the paper which followed it by A. W. Noel Pillers, F.R.C.V.S., on "The Treatment and Prevention of Canker of the Horse's Foot." A report will also appear of a lantern lecture, by Professor A. Linton, M.R.C.V.S., on "Hygienic Construction of Cowsheds."

THE SURGICAL DEMONSTRATIONS.

Success of the Practical Side of the Meeting.

FULL REPORT OF OPERATIONS AND DISCUSSIONS.

(By our Special Correspondent.)

The value of a series of demonstrations as an asset to the programme presented for the edification of members of the National at each annual meeting is best revealed by the degree of interest exhibited in this feature upon the succeeding occasion. Thus the anticipatory zeal in regard to attendance at the demonstrations held in connection with the Bath Conference, whatever else might have to be omitted, constituted a pleasing commentary upon the policy of presenting a programme the practical aspect of which should become increasingly able to bear comparison with an admittedly attractive theoretical side.

Upon this occasion, again, the opportunity of witnessing the work of masters in their respective operative spheres was keenly relished, and doubtless an unprecedented anticipatory interest in the practical part of next year's programme will bear witness to the success achieved.

In regard to the all-important matter, where operative demonstrations are concerned, of ability to view, it may be said at once that, short of a possibly long over-due revolution in the methods in universal adoption for the provision of such facilities, the arrangements were excellent. The Drill Hall in the Lower Bristol Road was, for instance, provided with a conveniently-placed gallery, as was the adjoining field with sundry utilisable hillocks, but such artificial or natural advantages were, to a large extent, nullified by the persistent obtrusion of the personal element, which upset the calculations of a thoughtful secretary in providing as suitable a venue for carrying out such a series of operations as could be found anywhere. Certain onlookers were, occasionally, one is pleased to relate, their own, but more often many other fellows' worst enemies in seeking to make readiness of access the servant of vision. If attempts at "roping off" are condemned to function as feebly in the future as they undeniably did upon this and preceding occasions, it is to be hoped that hereafter reliance for view-securing will be placed upon no less certain a method than the erection of some simple temporary tiered arrangement of forms. The spectatorial congestion was, however, considerably relieved by what might otherwise have been the regrettable necessity of carrying on several really interesting operations simultaneously—a consideration leading to the further suggestion that in future more time might be devoted to this immensely popular practical feature of the proceedings.

As it happened, the Fates somewhat eased the mental tension of members with unwillingly divided allegiance by providing Major Hobday's doubtfully inguinally-herniated foxhound with a mere hæmatoma, the discovery being made at a critical stage in the affairs of witnesses of Professor Imrie's flank operation for "rig."

LARYNGEAL OPERATION FOR ROARING.

The unavoidable and greatly regretted absence of Professor G. H. Wooldridge threw upon the hardly-worked shoulders of Professor E. B. REYNOLDS the duty of commencing the afternoon's programme with the laryngeal operation for roaring. His demonstration of a modification of Professor Williams'

operation for stripping the lateral ventricle proved a big attraction, practitioners evidently wishing to make themselves more conversant with this method of dealing with roarers worthy of selection from the ruck of the generality to be tracheotomied. Professor Reynolds was assisted by Major TAYLOR, with Mr. GOLLEDGE as anæsthetist.

The animal having been cast on the straw bed, chloroformed, and fixed in the dorsal posture, the skin incision in the middle line of the larynx was made, following the completion of antiseptic precautions. It may here be mentioned that the preliminary carrying out of a considerable proportion of the last-named measures before the animals were "brought on" would have saved an appreciable amount of the time which proved so valuable as the afternoon wore on. When down to the crico-thyroid membrane, hæmorrhage from the small transversely-running arterial branch there found, was checked by swabbing with adrenalin. Entering the lumen of the larynx through the membrane, the operator, in addition to complete ablation of both ventricles, removed one-third of an inch of the arytenoid end of the vocal cord on each side, taking care not to injure the arytenoid cartilage. Professor Reynolds lay stress upon the fact that this is a plastic operation, therefore it is very necessary that just so much and no more of the mucous membrane should be removed, or one tends to defeat the object one has in view. His incision was made definitely and only round the orifice of the ventricle—none of the mucous membrane, which normally forms a lining to the larynx, was interfered with. The burr was not used to evert the mucous lining of the ventricle, the insertion of a finger serving the purpose.

Discussion.

Major REES MOGG: I have here a larynx operated upon three years ago, and it may interest you to hear that I have had a fairly successful record. It makes a useless horse useful. I have only done animals that have been trained for street escort work. After being operated upon this mare was useful, and did Government work for over two years. I have seen Professor Hobday operate, and Mr. Williams did two standing, under cocaine.

After the horse is under and turned on his back, I make a slit between the cricoid cartilage and the first ring of the trachea, and go on pumping in chloroform all the time, as I am not a rapid operator. I have a metal tube put in. I did this one on the left side only.

Here is another larynx operated upon by Mr. Hobday ten years ago—the operation made a useless horse serviceable for ten years. It was done on both sides, and the horse was destroyed at the age of nineteen years, after a decade of restored usefulness sufficient for street work in London.

Mr. W. WOODS: I do not know whether anyone has had such an experience as mine—that three months after an operation I was asked to examine a horse for his wind, and after galloping he was going practically sound, but when, a fortnight afterwards, the man wrote again for me to see the horse with a view to giving a certificate saying he was sound in his wind, but, of course, had been operated upon, the animal was found to be as bad as ever he had been. Whether I had done something in his gallop I do not know—the early gallop may have loosened something which was there.

What we in the veterinary profession want to consider is, Is a veterinary surgeon justified in doing this operation on a stallion, unless it is castrated at the same time? I do not think so (applause). In such cases this operation is done with a view to deceiving the public.

A VOICE: Would you consider it equally important on the mother's side?

Mr. WOODS: Yes, quite. I will say that I would object to breeding from a roaring mare as strongly as I would insist upon the rejection of a roaring stallion.

Mr. J. WILLETT: There are other aspects than those mentioned regarding the operation for roaring which have lately come under my notice. In one case the horse was seen by Professor Reynolds, and when examined for the operation, the heart showed eight normal beats, then a slowing down for the next three beats, and then a stop for three beats. The great risk was pointed out. The owner was a 17-stone man and a thrusting rider, and had strained the horse's heart. When this condition is present it means that the success of the operation is jeopardised—also after it you get emphysema of the lung. The man said the horse was no use as it was, and he took the risk. When down, the jugular pulse was very marked, so we were glad to see him get up. We are waiting now to see if the horse will recover. In recommending this operation for a hunter, this condition should be pointed out to the owner of the horse.

Mr. TUDOR HUGHES: I should like to ask those who are in touch with the operation and know its effects to take the case of an animal conditioned for the hunting season, and within two months develops roaring, rapidly getting worse. It would seem a pity to throw that horse out. Would it be advisable to do tracheotomy and allow the horse to finish the season, and so prevent the disastrous effects referred to by the previous speaker, and at the end of that time perform the laryngeal operation and allow the tracheotomy wound subsequently to heal up after the thirty-six hours' risk of operation was over?

Mr. AVESTON: I should advise clients against the operation unless they took the whole risk.

The Reply.

Professor REYNOLDS: I should like to mention that the operation, as I performed it yesterday, is a little different from that which is generally carried out. I hoped someone would have asked about that. After complete removal of the mucous membrane lining of the ventricle I took out a small piece of the vocal cord on each side, next the arytenoid

cartilage. By removing one-third of an inch of the vocal cord in position, you allow a much freer healing back of the arytenoid.

In the specimens shown you will see how the vocal cord ties the arytenoid down. I am certain that my way is of benefit. I had the advantage of operating on a lot of horses cast for destruction and, in taking them in batches of twelve, killed one every three days to watch the process of healing. Healing was much quicker, and the percentage of recoveries greatly increased.

Mr. Rees Mogg said he gave chloroform throughout because he had to operate slowly. I do not think you need to give any more chloroform after you have opened the larynx—it means another wound in the throat, and, perhaps, so much more danger.

In regard to Mr. Wood's case, I do not think he injured the horse in the early galloping—probably some thickening had already started at the time in the tissues, vocal cord, or in the cartilages.

In Mr. Tudor Hughes' case of the hunter developing roaring early in the season, I would say certainly do not postpone operation till its conclusion. I would much prefer to do the operation and then start hunting him again as soon as possible. There is no reason why the horse should not be put into slight exercise again in three weeks' time, more strenuous after a month, and in another fortnight or three weeks he is fit to hunt. In tracheotomy the grave defect is that in quite a considerable number of cases there is deformity of the rings of the trachea, with stenosis of the larynx. I would not operate on a horse that had had a tube in for that length of time, because that horse would be making a noise through the stenosis of the trachea. Mr. Willett's case was interesting. I am certain that harm is done by hunting hard, as you may get heart strain and pulmonary emphysema. The sooner a horse that is a roarer is operated upon the better.

Another question that arises is whether it is possible that the heart trouble may be the cause of the roaring? My own opinion is that I know sufficient about roaring and roarers to know that we know very little about roaring, because one may reason that if you can operate successfully on one horse that is a roarer, why should not every horse become perfectly sound if you have no untoward sequel? I do not think that every horse roars from the same cause. You see such variations in larynges when you open them. Where you open the larynx and find the arytenoid and vocal cord fixed in the middle line. I have thought some anchylosis to exist within the arytenoid and cricoid, and it is only when I was examining the larynx after death that I found that this was caused by what appeared to be a tonic contraction of the posterior part of the thyro-arytenoideus muscle. As we all know, in any movement of the body there are various opposed groups of muscles, the one responsible for a movement and the other reversing it In this case paralysis of one muscle causes its opponent to remain fixed in a state of tonic contraction. If you divide the posterior belly, the thyro-arytenoideus, you will find that you can push the arytenoid to the side of the larynx quite easily.

EXTIRPATION OF MAMMARY GLAND (COW).

Admiration for the achievement of a colossal task and a whole-hearted resolve to avoid involvement in similar effort at all costs were the thoughts uppermost in the minds of the loyal group of enthusiasts remaining of the crowd which had first gathered to witness this operation. Cheers arose when Mr. R. W. HALL arrived at its (temporarily) triumphant conclusion with a tuberculous udder on the one side of him and a still living 50-lbs. lighter cow on the other. Neither the operator, nor anyone else with a client to face, would have started upon a subject with so vast an udder, which was in such a parlous physical state at the outset, with the perpetual likelihood hanging over him that a tuberculous lung would, when she was under chloroform, precipitate an overdue demise.

Mr. Hall, heroically pursuing his herculean task, could only have envied Mr. J. C. COLEMAN his mission of mercy at the other end of the animal, wondering the while how on earth the National would ever get out of his debt. A life membership might meet the case.

The subject was cast with special ropes, having a convenient ring affixed to lie over the left shoulder, and eventually firmly trussed in the dorsal posture.

Anæsthesia was easily induced by Mr. Coleman with an initial dose of ℥iss chloroform on cotton wool in a short canvas mask, which was wrapped round in a canvas cloth in the absence of the less porous and therefore preferable woollen one usually employed by the anæsthetist. The operation itself, despite the combined effects of hæmorrhage and prolonged chloroform anæsthesia in lowering blood pressure, would probably have been successfully endured by a cow in less hopeless physical condition than the actual subject, which succumbed some hours after its conclusion. Remembering that "a little blood goes a long way," extirpation of the gland did not appear to be an excessively hæmorrhagic performance, when account had been taken of an initial flow due to a nick of the pudic artery, which was rendered well-nigh undiscoverable at the outset by a mass of adventitious connective tissue.

A start was made four inches from the base of the udder along the side, adrenalin injection checking cutaneous hæmorrhage. After the mishap, to which reference has been made, the artery was traced just anterior and superior to the supra-mammary lymphatic gland; the artery having been ligatured, separation of the udder was continued mainly by means of forced traction and blunt dissection. After prolonged effort the entire gland was removed, and sutures placed in the skin wound only. The udder proved extensively tuberculous, with necrosed areas around the teats.

In all ℥viiss chloroform were administered.

Discussion.

Mr. W. J. YOUNG: May I ask Mr. Hall the result of his operation? Is the animal still living?

Mr. HALL: No. (Laughter.)

Mr. A. W. N. PILLERS: May I enquire under what conditions would Mr. Hall consider it expedient for the country practitioner to perform this operation, and what are the economic aspects of the operation?

Mr. TUDOR HUGHES: Having seen this operation attempted before, I think we all of us would agree that Mr. Hall faced a very big proposition when he started on it—(hear, hear)—and I think we can but admire his firmness and tenacity of purpose. (Cheers.) It is an operation that, to my mind, is not to be lightly undertaken. The only time upon which I ever saw it before was when I was a student at College, and I assisted my father at the operation—it was a case in which the animal would have died of gangrene. I thought that animal died from shock as the result of the operation.

Mr. ASHTON: I come from a feeding district, and we are troubled with garget in barren heifers and cows. A grave feature of this trouble is that they lose condition so rapidly; but these Herefords have small udders, and it seems to me that if the operation could be done simply and economically, it would pay the feeders to have the udders removed in anything that looked like being a long case. I would like to ask Mr. Hall if he does not think that in that case it would be an economic proposition?

Mr. LLEWELLYN JONES: When I saw the subject yesterday morning my heart went out to the operator—the sight of that udder was enough to put the fear of God into most of us. (Laughter.) It was a terrible subject to put before an operator with so many onlookers.

In a case where you get one quarter, or two quarters (on opposite sides), is it possible to take half the udder away and leave the other half, or one quarter and leave the other three?

The Reply.

Mr. HALL: When the secretary of the Association Committee asked me to undertake this operation (arising out of a statement I made that I had done this operation with some sort of success on three or four occasions), I felt in duty bound to accept his invitation and do my best. (Applause.)

I naturally expected a reasonable subject as regards its udder, and also from the point of view of its physical condition. That cow was suffering from generalised tuberculosis, and I was in fear and trembling the whole time I was operating that she would collapse through being chloroformed while being in possession of a tubercular lung.

The deed is done—the cow is dead. (Loud laughter.) With regard to the economic aspect of the operation, I can only say I have performed it on three previous occasions, and those have been extended over a period of ten years. So my experience of the operation was not a very extensive one. But I am still of the opinion that from certain aspects of udder disease the removal of a portion of the gland, or of the whole of the gland, is of economic value to the extent that it may be performed upon a valuable breeding cow, and she may produce progeny (though of course she cannot rear it), and that that may be carried on for some time after the udder has been removed. Also it is economically indicated where the life of a cow is jeopardised or, perhaps, where you have an infarct from gangrene, and where we can hasten the separating process by removing the dead and diseased portion. I would not, of course, undertake removing a cow's udder that had evidence of septicæmia, where you have acute gangrene. I should not suggest it, much less undertake it.

Where you have abscess formation and a little necrosis in a barrener which is in a lot of pain, I think removal would be advisable, and I do not think there would be any great degree of difficulty in doing it.

Yesterday's was a phenomenal udder—it weighed not much less than 56lbs., while a heifer's dry udder might weigh about 8—9lbs. Moreover, you have not the extensive cellulitis and adhesions attached to the crucial muscles obstructing the pudic artery. The lymph gland was so occluded by connective tissue that I cut down to the artery without knowing it. Generally you can readily locate the artery by the pulse.

I should not attempt to remove one quarter only—there is no recognisable septum between the anterior and posterior quarters of the same side. There is a distinct septum between the two quarters laterally, and I believe that you can divide the septum without any great amount of surgical difficulty.

CASTRATION OF CRYPTORCHID (FLANK METHOD).

For his demonstration of the flank method of castrating a cryptorchid, Professor D. IMRIE, of Glasgow Veterinary College, was another operator unhappy in the possession of an unfortunate subject. In his case, however, the handicap took the annoying but less serious form of a stubborn indifference to the anæsthetising properties of chloroform, and the consequent undue prolongation of the operation at least brought relief to those determined to see the main features of everything that was in progress.

The task of successfully administering what ran into ℥xii of chloroform was accomplished by Mr. F. CHAMBERS, of Wolverhampton.

The operation was entirely successful. The horse was cast on his near side, apparently completely chloroformed, and an initial flank incision made with the knife. Proceedings were then delayed for some time, until an astonishing degree of chloroform satiation had been attained, when it became possible for the operator to proceed, severing the panniculus with scissors, and subsequently finding his way through the oblique and transversalis muscles and the peritoneum into the abdominal cavity; the missing testicles were secured, brought into a position of accessibility, and removed with the emasculator.

Professor Imrie sutured the peritoneum and transversalis muscle together with kangaroo tendon and then proceeded to suture the other muscles separately.

Discussion.

Mr. J. WILLETT: I should like to congratulate Professor Imrie on his operation, which I saw admirably from a front seat in the gallery. But I saw the animal after, and I thought he had left the other testicle. Was that the case, or not?

Mr. H. L. ROBERTS: We in the Eastern counties are credited with a certain amount of knowledge concerning the operation for cryptorchidism, and I think I can safely say that those Eastern county practitioners who witnessed the operation yesterday can say that it is the first time that we have seen a "rig" castrated by the flank method; and as most of us have for some years practised the other method, there are several doubts arising in my mind as to which method is the better one to adopt. In the first place there is the question of anæsthesia. To my mind there was a very considerable amount of chloroform used for the successful completion of the operation. Secondly, the length of time occupied by the operator seemed to contrast greatly with the time needed to get into the abdomen through the canal. Thirdly, the amount of cutting, or division in the continuity of the tissues, seemed to me to be almost alarming.

I do not wish to be a captious critic of our friend, but did he remove the whole of the testicular organ? Was the epididymis returned to the abdomen with the exceedingly short spermatic cord?

With regard to the emasculator, as a country practitioner I can say that I have used that particular instrument this year on over 100 male equines of all ages in the standing and recumbent positions, and I would say that I have not castrated one by the ecraseur this year, after having used that instrument for many years. I should like to hear what Professor Imrie has to say of this hæmostatic instrument as compared with the ordinary chain.

I should like to add my vote of thanks to Professor Imrie, and I hope that the horse will make a splendid recovery.

The Reply.

Professor D. IMRIE: In reply to Mr. Willett, I may say that I did remove the other testicle too with the emasculator. To deal with the remarks of Mr. Roberts, in the first instance we know that the animal seemed to take an enormous amount of chloroform; but that is not, of course, usual, and I really cannot explain it—they all did yesterday, which proves that the fault lay with the chloroform. (Laughter.)

It is undoubtedly an objection to the operation that it takes so long, if one attempts to follow out the technique I did yesterday. It is quite sufficient to make a large wound, 4 or 5 inches long, through the skin and subcutis, then divide the external oblique muscle, separate the fibres of the internal oblique, thrust the hand into the abdomen and take up the testicle. That operation may be done a great deal more quickly than the orthodox method, and, I believe, with quite good results. I was very anxious, with the opportunity that I had yesterday, to suture the peritoneum. It is only the second time that I have done it. I sutured the peritoneum and the transversalis muscle together, then I sutured the other muscles separately.

Yesterday was the fourteenth time I have performed the operation, and I do not know that I ever perform it exactly alike on two consecutive occasions. On a number of occasions I have just placed two, three or four wider sutures through the muscular wall.

With regard to the emasculator, it is ten years since I adopted this method of using the Haussmann and Dunn instrument, and I have found it excellent in every way; there is no hæmorrhage. In emasculating, put the cord in and crush it slowly, then open it at once. I think this instrument is incomparably superior to the ecraseur, at least my experience of it has been very happy. (Applause.)

PASSING THE STOMACH TUBE.

In this demonstration Mr. W. W. LANG employed an ordinary piece of stoutish white rubber tubing of medium calibre. This he pressed up the left nostril of a haltered horse held by one man.

The tube was carefully but easily passed up the nose, over the pharynx and into the œsophagus. The other end of the tube was attached to a pump, the working of which effected the injection of fluid into the stomach.

Discussion.

Mr. HEATLEY: I would like to say what pleasure it gave me to be able to see Mr. Lang pass the tube. The army tube formerly issued I found to be of too great a calibre. On withdrawal there was a considerable amount of hæmorrhage.

Mr. G. E. SAMPSON: I should like to ask what Mr. Lang's experience has been with the feeding of animals with tetanus by means of the tube. I have been able to pass it only up to the third day, I found it very useful in an animal unable to close its mouth.

Mr. LLEWELLYN JONES: This stomach tube seems to be part and parcel of Mr. Lang (laughter), and we are much indebted to him.

Does Mr. Lang pass the tube indiscriminately in every case of colic—any abdominal pain—in the horse? Do you pass it for diagnostic purposes? If so, you must have at some time or other met with rupture, and probably a ruptured stomach. Have you ever been blamed for it? What are your indications?

The Reply.

Mr. W. W. LANG: Mr. Heatley spoke about the size of the tube. As a good many of you know, I have discarded the old tube—they are all going to be scrapped. They were much too large, and on account of hæmorrhage they had brought the tube into disrepute with the clients, though the veterinary surgeons know they are all right. I have never fed a horse with tetanus, but I think I have never failed to pass the tube when I have wished to do so.

Mr. Jones has stirred up a big subject. He asks about the diagnostic value. It has not been my lot to see a case of ruptured stomach for years. I am very pleased about that. Clinically, for our own sakes we would not pass the tube. In ordinary colic cases I always put the tube straight down. It settles the question of tympany at once. I often find, if there is tympany further on, that you can hear regurgitation a long way back in the small bowel, and in some cases I find it advisable to remove all tympany before you give, say, arecoline hydrobromide. The more I see of the use of the tube the more satisfied I am that we are going in the right direction. My powers of diagnosis have been greatly increased by its employment. There is one diagnostic aid which we get—if, in giving, say, saline formalin solution, you can give 4 or 6 gallons of it without great discomfort to the animal, you can rest assured that you have no twist. I think I have said enough to encourage you in the use of the tube, and the thing is still in its infancy. I think that once you take it up your interest in your work will be increased, your work will be much better, and your reputation will be considerably enhanced with your clients.

Castration Standing under Cocaine.

A demonstration that appealed to many as being of great practical utility was given by Mr. R. Hudson, of Retford, who castrated six standing colts which maintained a remarkably equable demeanour under the influence of local injections of 7½ per cent. cocaine. Five per cent cocaine is normally efficient, but the greater strength was judged advisable for demonstration purposes.

The anæsthetic was injected in 1 volume of 3 cc.s. into the posterior part of the testicle, and this proved the most—in fact the only—ticklish part of the business. Three colts were thus castrated with the actual cautery and three with the Haussman and Dunn emasculator, the twitch being removed after cocaine injection in the majority of cases.

Discussion.

Mr. J. Fox: I should like to know why Mr. Hudson did not castrate the last horse yesterday?

Mr. Llewellyn Jones: In injecting cocaine solution, what is the object of penetrating the whole thickness of the testicle so as to get on the upper border of it? Why not, instead of giving him that pain, inject directly into the epididymis—inject right into the cord above the seat of operation, and not below it?

Mr. G. E. Sampson: Can Mr. Hudson explain the fact that after using cocaine for these castrations, by the time you have finished the operation you get œdema of the scrotum to a considerable extent?

Mr. H. L. Roberts: I should like to thank Mr. Hudson for his interesting and instructive demonstration. (Applause.) But I should like to have an expression of opinion from him as to the suitability of this method in the standing posture in the case of an aged stallion, and if he would give us in detail the proportions of the solution; also if he would give us the benefit of his experience in the use of the method on a stallion six years old which has been refused a licence to travel.

The Reply.

Mr. R. Hudson: The answer to Mr. Fox's query is that the last horse was not a subject which anyone in the ordinary way would have castrated standing. In the first place the horse was probably a bad kicker, then the testicle was not down—only resting in the external inguinal ring. There was one pony in the same condition. I could only just feel the testicle with two fingers, but, it being a quiet pony, I was able to inject cocaine under the skin, break down the connective tissue in the inguinal region, and draw the testicle down.

In reply to Mr. Jones, I only inject cocaine right through the testicle in small ones; in large I inject it about the lower part of the upper third, because the lower part of the scrotum is the least sensitive to pain.

Mr. Sampson says that he gets œdema of the scrotum with the use of cocaine. I do not know why, unless it is that perhaps he is using cocaine with carbolic acid in it—say five minims to the ounce. If much of it escapes into the scrotum, it will set up some œdema.

Answering Mr. Roberts, I can only say that this is a splendid method for aged stallions. (Applause.) It requires, perhaps, a larger quantity of solution than we used yesterday, and that should be placed well up in the back of the epididymis, and sufficient time allowed. The operation can be carried out quite as well on an aged animal as it can on the younger ones.

The following demonstrations were also carried out on the Wednesday afternoon, but sufficient time was not available for their discussion on the ensuing morning.

In addition to the standing castrations, Mr. R. Hudson carried out the operation on the "last horse," to which reference is made above. The operator removed with facility and speed a testicle from the external inguinal ring of a two-year-old colt. This horse, which was chloroformed standing by Mr. J. Thorburn, of Crewkerne, went down in 5½ minutes. He was laid on the near side, the leg drawn up, and an incision made as for rig castration. The testicle was found in the position stated and removed with the emasculator. There was no hæmorrhage.

Vannerholm's Operation for Paralysis Penis.

The delicate manipulative dexterity of Major F. J. Hobday was much admired in this plastic operation on a recently-castrated animal, which developed paraphimosis through infection of the penis, the skin having become tumefied and forming a thick ring. The subject was chloroformed in the standing position by Mr. J. Thorburn. Mr. Gooch was the assistant operator.

After the adjustment of a blind or halter with two long webs affixed and three men told off to each, with instructions to keep in line in following the movements of the horse. A short mask was used, with an ingenious hinged rubber cap, into which was placed a sponge containing ℥ii chloroform as an initial dose. The animal proved a stubborn subject, and after exhibiting the customary persistent inclination to run back, but without a suspicion of a stagger for five minutes, an additional ℥iss was given and a rug applied. Soon after the horse subsided quietly to the ground. He was secured on the near side, the upper hind leg being drawn up as for castration.

The operator made a "bracelet" of the integument to be removed, and inserted half-a-dozen Halsted surtures round the circumference. The integment was then cut above the sutures around the whole of the circumference. Major Hobday then proceeded by blunt dissection to free the bracelet of integument from the substance and the penis. Next, by a circle of interrupted sutures, placed rather less than half an inch apart, the ends of the skin were united.

The penis was finally pushed back into the sheath, across which were inserted two tape sutures to maintain it in position. The interrupted sutures were to be allowed to slough out, or to be removed in ten days, according to the condition revealed.

Scrotal Hernia.

The subject of the first of these demonstrations by Professor E. B. Reynolds—a horse—had a scrotal hernia on the off side. He was cast, anæsthetised, and fixed in the dorsal position with the hocks well flexed.

On opening up the scrotum the tunics were brought into view, and they were freed up to the external vaginal ring. The hernia had become spontaneously reduced, but no testicle could be made out. Eventually the epididymis was located up in the inguinal canal, and this, together with a very ill-developed testicle, was pulled down and on the bottom of the sac. But the cord of the testicle was too short to allow of the ordinary covered operation if castration to be done with any degree of safety, as the operator could not be sure that no bowel in omentum was down.

The tunics, therefore, were opened by a short incision and the testicle removed high up in the canal by an ecraseur.

The incision in the tunics was sutured and the clamp put on the tunics fairly high up towards the external inguinal ring as in the ordinary covered operation.

The second subject operated on by Professor Reynolds for scrotal hernia was a Pekinese, one year old, affected on the right side. The owner did not wish any effort made to preserve the testicle.

A short incision over the external inguinal ring laid bare the tunics enclosing the testicle on cord. The tunics lining the scrotum, including only the testicle, were withdrawn from the scrotum through the operation wound. A ligature was placed over all, close to the external inguinal ring, and the testicle and sac removed immediately behind the ligature. The external wound was sutured.

The spraying of a bitch by Major F. T. Hobday completed the surgical proceedings.

Other Demonstrations.

Instruments used for Sterility.

The following instruments used for sterility were exhibited and their employment explained by Captain L. C. Maguire, F.R.C.V.S., Fairford, Gloucester.

1.—Vaginal speculum, of the bi-valve type. Employed for dilating the vagina, when a visual examination of the external *os uteri* is desired. The advantage of the instrument exhibited is that it can be used with the greatest facility even on young virgin heifers.

2.—Albrechtsen's uterine forceps. These forceps are of special design for attaching to the lips of the external *os uteri*. They are employed for drawing back the uterus into the vulva whenever it is necessary to apply medication to the uterus, cervical canal or external *os*.

3.—Flexible probe. Employed in determining the direction of the tortuous cervical canal before inserting the dilator.

4.—Knowles' cervical dilator. Used when it is necessary to dilate the cervical canal; this is necessary in any condition of the uterus which necessitates intra-uterine medication.

5.—Bozemon's uterine catheters of various sizes. Used when giving ultra-uterine douches. These instruments are made on the return flow principle, and, as such, permit of the application of medicaments to the uterus which, if coming in contact with the vaginal mucous membrane, would cause violent irritation of the latter. As the return flow from the uterus is expelled through the instrument external to the vulva, the above contingency does not arise.

6.—Double curved cervical dressing forceps. Utilised for applying nodical dressings to the internal and external os and cervical canal of the uterus.

7.—Albrechtsen's long rubber catheters. Employed when it is necessary to wash out a thin-walled peretic uterus, in such conditions as pyometra. By the use of these flexible soft rubber catheters the danger of rupturing the walls of the uterus is done away with.

8.—Williams' guarded knife. This instrument is used for rupturing cysts which are surrounded by a tough fibrous capsule. The incision into the follicle of the ovary is made through the vaginal wall. In the same way the fibrous covering of a retained *corpus luteum* may be cut through.

Exhibit of Poultry Diseases.

A demonstration of bird diseases was given on August 2nd and 3rd, by Captain Rice, B.Sc., F.Z.S., from the Veterinary Laboratory of the Ministry of Agriculture and Fisheries, where research work is being carried out as a part of the national scheme of poultry investigation.

Sixty specimens, with explanatory cards and plates, were shown which demonstrated our present knowledge of the macroscopic and microscopic characters of the causal agents and lesions of poultry diseases likely to be encountered by the veterinarian. It was made clear in the cards describing the specimens that the many diseases of birds offer wide scope for investigation and treatment by the profession. The demonstrator stated, in answer to enquries, that the losses amongst poultry in this country were very heavy, and that there was a great demand by poultry farmers for expert advice. He was of the opinion that practitioners should interest themselves more in poultry diseases, and said that the Ministry was prepared to advise veterinary surgeons when dealing with contagious diseases.

The specimens on view included the following :—

Fowl cholera : lesions in heart, lungs, intestine and joints. Also smears and sections.

Fowl plague : lesions in the heart and alimentary tract (the first recorded outbreak in this country was diagnosed by the demonstrator in 1922).

Avian diphtheria : early and advanced lesions.

Bird pox : early and advanced lesions.

Tuberculosis : lesions in liver, intestine, lungs, joints, and ribs.

Aspergillosis : lesions in lungs and abdominal cavity. Also sections.

Infectious entero-hepatitis : lesions in liver.

Coccidiosis : lesions in liver and intestine. Also sections.

Internal parasites : cestodes and nematodes, " gapes," air sac mite.

External parasites : mites (3 species), scaly leg mite, sections and lesions, fleas (5 species), lice (8 species).

Neoplasms : carcinoma, sarcoma, lymphoma, angioma.

Various : bumble foot, strangulation, intussusception, etc., intestine.

Cultures : *Aspergillus fumigatus, b. avisepticus, b. sanguinarum, b. tuberculosis, b. paratyphosus B., b. pullorum.*

THE ANNUAL DINNER.

The annual dinner was held at the Grand Pump Room Hotel, on Thursday evening, August 3rd, under the presidency of Henry Sumner, Esq. (the newly-elected President of the N.V.M.A.). The representative company included the Mayor of Bath (Councillor Ernest J. White), Dr. W. G. Savage, M.D., D.P.H., M.O.H., Somerset ; Dr. Blackett, M.D., D.P.H., M.O.H., Bath ; Captain F. H. Storr, O.B.E., Secretary of the Bath and West Counties Society, etc.

Proposing the toast of " H.M. the King," the President said : It is the privilege of the Chairman to have the opportunity of proposing the health of H.M. the King. No further words are needed to a Britisher, except to mention that the king stands for what we look upon as being an ideal man, and ideal father, and an ideal king.

The President also proposed the toast of " H.R.H. the Prince of Wales, H.M. the Queen, H.M. Queen Alexandra, and all the Royal Family." He said : Again I have no need to make any expression regarding our love and respect for that noble and Royal house. I can only join with the rest of mankind in congratulating the country and the world on the product of the Prince of Wales. He is a remarkable individual, and I hope he will go on to a remarkable destiny. I do not think it is necessary to name particularly the others, although we love them all. Her Majesty Queen Alexandra has been our beloved ever since she has been in these Isles.

It has been suggested, continued the President, that the following message be tendered to His Majesty :

> " Your loyal subjects, the members of the National Veterinary Medical Association, now assembled in Congress, tender your Most Gracious Majesty their respectful homage, and trust your Majesty may accept this as a mark of their deep devotion."

Mr. A. W. Noel Pillers, F.R.C.V.S., proposing the toast of " The City of Bath," said : I rise to propose the toast of " The City of Bath." For some time now I seem to have developed into the official proposer of toasts for cities and, knowing as we do the workings of the official mind, you will probably forgive me for any shortcomings. In the address of welcome to us, His Worship the Mayor of Bath made a suggestion that it might be possible for the waters of Bath to be of value in the treatment of diseases of animals. Now, we always claim that the veterinary profession is a very reserved and unassuming one, and although that is so, I think we may claim that it was a forerunner of our profession who pointed out the value of the waters of Bath. The first experiment happened somewhat in this way. In the words of the guide who took us round the other night at the Pump Room, " I want you to let your mind wander back a little bit farther than the Roman Period," a thousand years or so. At that time there was in this district a royal prince who suffered from a skin affection, and who left his family and went on a journey. He probably took a route which is now along through Twerton, Newton St. Loe, Saltford, going down Longreach until he arrived at Keynsham. Having got there, it being about eight miles (and being a prince I suppose he could not walk very well) he became tired. He offered his services to a man who kept a lot of swine. He had not been there long before he noticed that the swine were contracting the

same affection that he had himself, and being a very astute kind of person, he suggested that he might take the swine a little farther away from the observation of their owner. He wandered along the road until he came to a place called Swinford. That is where the swine crossed the river. After further wandering along in the direction of Bath, these swine wallowed in the mud. When this was removed, he noticed that they were very much better, and he tried the same treatment himself with miraculous results. He went back, and I believe from that day the properties of the mineral waters of Bath became established. For my own part I always regret that more records have not been kept of this very historic event, because I have long formed the opinion that it must have been sarcoptic mange. (Laughter.) Unfortunately, I have been unable to obtain any fossil remains, so that I might examine the scrapings. I think, however, that we may at least claim that a person interested in the treatment of animals did more or less pave the way.

In addition to this comparatively remote historic fact, all the surroundings of Bath, and Bath itself, are of intense historic interest. We have enjoyed looking round your city, and it has been a great pleasure to us. If we had gone further afield, we should have seen all kinds of relics of the times of Charles the Second. In the district of Keynsham very many important events took place and there are lots of buildings now in existence where the royalty of the time took shelter in those severe days. To us, then, Bath is of extreme interest, and we in this sense have enjoyed it very much. People from Bath, and some of the examples that we have had in some of the old Bathonains, have shown how individuals may leave their mark on the times. We all know the great good that Ralph Allan did. It is due to him, I think, that the Stone Firms, whose name we now see on the railway trucks travelling all over the country with the name Bath Stone Firms on them, sprang into existence. And through him we have the work of those two great architects, the Woods, handed down to us. Some of their sound structures you can see in your walks around the city.

We have noticed, too, the old custom instituted by Beau Nash, that at 11 o'clock it is time to "pack up," has been kept up to the very letter since we have been here. (Laughter.) In addition to that it was he who abolished the wearing of swords, which must have been an inconvenience after 11 o'clock at night. Of course we owe our indebtedness to Beau Nash. It has been the custom for centuries for great men about to conduct great campaigns or undertake great works to come to Bath for rest or preparation. I hope that the National Veterinary Medical Association in coming to Bath is preparing for greater days. (Applause.)

Looking round, one often thinks of the leisure and leisurely way in which the West of England conducts its affairs, and it is really remarkable that a man like Pitman, who seemed to want to institute a rapid way of getting a "move on," should be a Bathonian. Anyway that is so, and we owe to Bath and Pitman a tremendous amount of progress. Now, Bath is always with us. We start early on with Bath buns; in later life we have to do a little polishing with Bath brick, and many of us will probably end up in a Bath chair. (Laughter.) How important Bath is to us who reside in other portions of the country. To us as veterinary surgeons Bath has a very peculiar interest indeed. There are very few of us that cannot remember the works of Broad, the veterinary surgeon of Bath (applause), and in Broad we have a figure who applied physiological processes to the cure of disease, and often to-day we read and talk of Broad with respect.

Apart from the actual veterinary aspect, Bath always has been a little centre of sporting instincts. I well remember the days of the old North East Somerset Yeomanry, when little battles used to take place round Newton St. Loe; also the Lansdown races, and some of the celebrated men you had in this town, who used to delight to go up on Lansdown for a small sporting wager and walk eight miles to the hour.

In addition to that, Bath is the centre of the Bath and West of England Agricultural Society, and many of us remember the great works of Plowman. So Bath appeals in a very peculiar way to the veterinary profession. From my own point of view, a selfish one, I must say that I spent very many pleasant years in the neighbourhood of Bath, and from some people in Bath I have imbibed some of my love for natural history. It is to me a great pleasure to have the privilege of proposing the toast of the City of Bath, a town which to us has been so open in its hospitality. I therefore ask you to rise and drink the toast of the City of Bath, coupling with it the name of His Worship the Mayor, Councillor White.

The toast was cordially received, and the MAYOR replied in the following terms: May I first of all congratulate Mr. Pillers upon the excellent way and kindly manner in which he has proposed the toast of the City of Bath. His knowledge of local history is abundant, and I am certain it is correct, although I did not know some of it before. (Laughter). I only hope that we shall have further opportunities of conference together, because some of the facts he has given us will help us in a new version of Anstey's book on Bath. (Renewed laughter.) I could not quite understand his allusions to Keynsham, except to say that it is a little hamlet upon which the city of Bath has long had its eye with the intention of adding it and bringing it within the boundaries of the city. Of course Bristol is another suburb which we also hope to bring in in due course. (Laughter.)

Bath, I think, should especially appeal to the Association of which we have in this room a considerable number of members. What is the record of Bath? As you have already heard, Bladud, the first known veterinary surgeon, came here with his swine. I dare say he also was finding the Bath waters excellent

for those particular animals. He found the hills of Bath were splendid exercising grounds for horses. He probably attended Bath races, which are held three times a year. He probably looked forward to attending the Bath Horse Show, which, by the way, I think we can claim to be the best horse show held outside the city of Dublin. Of course, if we believe what we see in the papers, for the last two or three years the greatest exhibition that Dublin has been giving during that time is not a show of horses, but of mules (Laughter).

Then, of course, Bath Corporation owned a very fine stud. You will be sorry to know that that has been dispersed. All they have left is a mayor, and they claim that they have the finest mayor in the kingdom. Of course it is not for me, who am a modest man, to say anything about that. (Laughter.) If you attended the meetings of the Bath City Council, you would frequently hear fine bulls! Then we have a dog show and a cat show. Next year we have the Somerset County Agricultural Show, and in 1926 we have "booked" the Bath and West Show.

You, of course, are here to-night for business, and you have done it remarkably well. I feel too full for words. (Laughter.) It is, therefore, only fair that I should remind you, and remind the outside public who are interested in your proceedings, that there is no section of the community to which veterinary science is not of importance: its value in regard to public health is important, first in connection with the prevention of disease in relation to milk, and next in relation to meat. With regard to agriculture, your Association again is of importance, because it safeguards the valuable stock of the country, and in your Association and from it men are available for public health appointments who have specialised in these various branches of the science. Then, I understand, you have special courses of instruction which lead to the granting of post-graduate diplomas in veterinary state medicine. That is important. The veterinary profession has, I understand, like that of the law, one portal system of entry. That, I think, is a very good thing. Yours is the Royal College of Veterinary Surgeons. You are justly jealous of that one portal. I do not blame you. You are jealous not without good reason. You are jealous for many reasons, one of which—I take it not the least important—is the fact that it ensures a uniform minimum standard of training and education, and this is essential to the public interest. (Applause).

Those are the aims and objects of your Association, and I do not think they can be too widely known, because some people have altogether incorrect ideas about a conference. They seem to imagine that a conference is merely junketing of one sort and another, and a kind of holiday. Well, those men who do not combine business with pleasure all the year round have a very sorry time. I do whenever I can. If I cannot poke fun at somebody else, I poke fun at myself. (Laughter.) The veterinary profession, as you know, is a skilled profession. I am quite certain that Mr. Aveston is a skilled man. I always regard him as a kind of canine Svengali, capable of mesmerising or hypnotising any animal. (Laughter.) The ordinary medical man can ask his patient what is the matter, but the veterinary surgeon has to ask himself what is the matter with his patient, which is a very different thing. A physician can put his mistakes underground. (Laughter.) A veterinary surgeon sometimes lives to eat his own errors. (Renewed laughter.)

Since the Government imported mules into this country, I am told that the insurance premiums upon the lives of veterinary surgeons, and for accidents which may befall them, have considerably increased. It is said that you cannot be cruel to a mule, because a mule will stand more beating than a sitting-room carpet. (Laughter.) And these are the sort of animals that veterinary surgeons have for patients. Well, a mule is always sure-footed, especially with his hind foot. I am told that every person living who drove a mule team in the late war is drawing a pension, in most cases 80 per cent. unfit. (Laughter.) A mule looks all innocence, but he is in no sense innocent. From all I have heard about mules from veterinary surgeons, if I had to take my choice between being a caretaker of a mule and a nitro-glycerine factory, I should take on the nitro-glycerine factory. (Laughter.) Yet the average veterinary surgeon takes all these risks, and he is very badly paid. (Applause.) Mr. Pillers talked about the scrapings. (Laughter.) I like to see a man well paid, but I have heard veterinary surgeons in courts, especially in police courts, talk so much about scrapings that I have come to the conclusion that they never get anything else. Veterinary surgeons are not as well paid as they ought to be, and I hope that one of the results of your conference will be that in future you will be able to raise the status of your profession, and incidentally the state of your fees. I have nothing to say against veterinary surgeons myself. There are more law suits owing to people buying horses without calling in the veterinary surgeon to examine them first than from any other cause I know. Therefore I have no reason to complain at all. (Laughter.)

It only remains for me to thank Mr. Pillers for the very kind and very able way in which he proposed the toast, and to say again how glad I am to be here, and how honoured I am that you have coupled my name with the toast. I hope that this is not the last veterinary surgeons' conference which will be held in this city. (Applause.) Come as often as you can: the more the merrier. Although I shall not be in office—at least I don't suppose I shall—I am sure that the Mayor of Bath, whoever he is, will be only too pleased to welcome your Association. (Loud applause.)

The next toast, that of "The Royal College of Veterinary Surgeons and the National Veterinary Medical Association," was proposed by Dr. W. G. SAVAGE, Medical Officer of Health to the Somerset County Council. He said: I should like to say how greatly I value the honour of being allowed to propose the toast that stands in my name. I have always had

pleasant associations with the R.C.V.S., going back to 20 years ago, when I was a lecturer in Bacteriology, and the Royal College used to offer me every facility in the way of materials for my various courses. As regards the N.V.M.A., I have been very glad to attend the congress to-day, and I was very impressed with the very excellent way in which you managed your business. I think an Association of this kind is of very great value. I know that our own Medical Association is of great value, and I am sure that yours is. When a man gets in practice, away from his fellows, he at once loses his enthusiasm and develops into a money-making machine and nothing else, and an Association like this, by bringing men together, helps one to realise that there is something more than to be money-making machines in our different professions. An Association of this kind is also of great value for the purposes of research. I have always been keen on research, and you can never get research unless you bring men together. I gather that you are a great Association for research.

You have an honourable profession, and there should be more association between you and the medical profession. I have felt for so many years that there is a great field of undiscovered country which has been excluded by your profession and mine, as being a sort of borderline between the two. I think a great division is made in that direction, and I hope a great deal more will be done as the result of a permanent co-operation between the two professions, which will be of benefit to both branches. (Applause.)

The PRESIDENT OF THE R.C.V.S. (Mr. H. Sumner, M.R.C.V.S.), who first responded, said: As President of the Royal College of Veterinary Surgeons, and as the newly-elected President of the National Veterinary Medical Association, I sincerely and heartily thank Dr. Savage for the kind words in which he has proposed this toast, and more especially for the kind way in which you have received it. Conferences and congresses are necessary to the life of the community, and they are also necessary to the life of the profession. Even our small profession, numerically, cannot be small in the objects which it may attain.

Our good friend, Mr. Mayor, being a better Bible student than I happen to be, has been good enough to hand me a quotation from the Proverbs—"Iron sharpeneth iron, so a man sharpeneth the countenance of his friend." I feel sure that that is a most appropriate text for a meeting such as we have held this week in the city of Bath. I can only say how much I, the incoming President, appreciate all that Bath has offered and done for our comfort and welfare, and the friendship, sympathy, toleration and expectation which has been expressed should lead us to higher flights in our profession.

The Mayor, a member of the legal profession, has been good enough to mention that we, like him in his profession, enjoy the one portal system. Now there is nobody in this room, I take it, who wishes to destroy that one portal system. It is a priceless heritage of our forefathers, and in my opinion, if the Royal College rises to the occasion, as I feel sure she will, she will preserve inviolate that priceless heritage to pass on to her sons and daughters who are now eligible to enter the ranks of our profession. (Applause.)

I have some experience of the Royal College. If she is comparatively old, and if she has fulfilled, fulfilled well—and she has fulfilled and fulfilled well, or else her qualification would not stand now as it does, pre-eminent practically over the face of the globe—and maintained the prestige of her license, I believe she will, if necessary, so alter her curriculum and her examinations that there will be no need for any other portal system to be instituted into our profession. (Applause.) I think that we are bound to recognise in this period of the world's history that, as a result of the world's appeal, some changes may of necessity have to take place, but I have faith in the Royal College that she will know her opportunity and will take the tide on the flood. So much for the Royal and licensing body, of which we have all reason to be proud.

Now I will speak a few words, and few words only, as to the advantages of the National Veterinary Medical Association. They cannot be over-estimated. We can go back to the quotation, and it is more apt, perhaps, in application to the working of this Association. I think if there is one outstanding factor which is comforting and helpful to us all, it has been made plain by the very generous way in which the proposer of this toast has expressed his feelings of our profession. He has recognised, as we all recognise, that "No Man's Land," and up to a certain part of our history—I hope I am not saying anything that I should not—I think we were what I deem to be an isolated profession. We were distinctly isolated in our origin, proprietary and otherwise. We were not associated with any of the great teaching centres and degree-conferring bodies of this land of ours. But a time came, and I believe the time was opportune, when some of us could see that an opportunity presented itself that the training of our men would be of an advantage to the profession if one of the schools, at any rate, was transferred under the *ægis* of a university. I am not here to discuss the immediate success, or non-success, from a licensing point of view of the coming of the effort, but I am distinctly persuaded that that was the beginning of the time when our profession broke down some of its isolation. Our medical friends know us better, and they receive us better. We are not altogether clinical sharks. We have an object which is national and which touches us very seriously, and I believe that that was the beginning of what I do trust will be a glorious end. (Applause.)

The relationships between our profession and our sister profession—we ought to call it our "big brother"—have not been as congenial as might be desired, but I am distinctly of the opinion that that feeling is being broken down, and that it is up to our younger men to take opportunities of training such as will fit them to be confrères of the best men that the medical profession can turn out. In his presidential address, Dr. Bradley took three distinct

heads for the advancement of our profession, and with his permission I will refer to them. One was education; the other was research; and the third—a very necessary one—was the question of remuneration and salaries. We are all perfectly persuaded that in the time at our disposal in our curriculum our efforts to turn out men with an average foundation education should be, if possible, more strenuously pressed. I do not consider from a practical point of view that we can ask our men for the license to undertake a five years' training, such as is necessary for the degree course, but I do think that a four years' training might, perhaps, be so devised that we may pay more importance to what we call particularly the veterinary subjects of our curriculum.

In research, surely is a place where our friends, the medical men, and ourselves, have common grounds, and we should be prepared to work together for the common cause. We should be comrades in arms, and we should work shoulder to shoulder for the life of mankind and for other national purposes. I will refer briefly to the question of emoluments and salaries—the sordid side, if you like. The starting salaries of our whole-timed men are an insult to any trained professional man. Can it be fair, in the year 1922, to expect a professionally-trained man to give his whole-time services for the country for £200 a year? There can be only one answer, and I call it an insult. (Applause.) What is the redress? First of all we must have unity. Have we got unity? Not whole-heartedly. How can we get unity? By a further propaganda of such a congress as we have enjoyed, and which has been such a success in the city of Bath. If we get unity such as is expressed by the General Medical Council in regard to the emoluments offered for important public posts, then, and then only, shall we be able to dictate what we consider to be a fair emolument for those who have been trained and qualified as veterinary surgeons. That is one object—a sordid one it may be—but until we arrive at a state of unity, I am afraid there always will be these unfortunate lapses into what I would call the insulting terms of emoluments for our men.

I, as the incoming President, with a future before our next meeting in view, can only say that I hope it will equal or eclipse that of which this function is practically the closing ceremony. As far as I am concerned, I have not been to every National meeting in my somewhat long life, but I have been to a good many, and never was I at a meeting where there was such a comradeship, nor where such enthusiasm has been shown as in this city of Bath. So much so, that I feel it to be my duty to ask my Council to seriously consider the procedure of the conferences which will succeed this. Although we are such a small body, and we cannot compare numerically with our medical friends, I feel that after our experiences at this conference the time has come when we should go in for sectional conferences. I would suggest that there should be a conference in veterinary medicine, another in our type of surgery, and another—by no means the least important, and perhaps the most important—in the department of veterinary public health, so that we might embrace a wider field. I ask you as members to think carefully over such a proposal, and to see whether you approve, and whether you think it will be conducive, as I distinctly hope, to the betterment of the results of our conference.

I can only again thank you, Dr. Savage, for the kindly way in which you have proposed this dual toast, and to assure you that our remembrances of Bath and the kindnesses we have received here will be enjoyed for many years to come. (Applause.)

The toast of the "Imperial Forces" was submitted by Mr. S. H. Slocock, F.R.C.V.S. What a glorious toast for a man to try to propose, he said. What an almost impossible task to a mere civilian. Great orators through the country have proposed this toast. Books, even, have been written on it, and yet have they expressed that admiration and gratitude that we feel for the Imperial Forces? Of the Forces we were led to understand always that the Navy was the oldest and our first line of defence. Recent warfare has not made us doubt the first statement, but where is our first line of defence? I take it that our line of defence now has no first: it is our Imperial Forces, the different parts of that Force constituting one defence. In the early days of August, 1914, we had a Navy of which we were proud, and we had an Army—a small one—of which we were proud. It was described by one person as "a contemptible little Army," and yet within a short space of time our Navy was augmented, our Army and its various auxiliary forces were transported to the seat of war, and they did as British soldiers always have done and always will do to the end. We feel an extreme sense of affection for those Forces and great gratitude for their achievements. It is the desire, I feel sure, of every Britisher that the Navy shall be maintained and the British Army maintained compatible with the safety of this great Empire.

In the Army there is one particular Corps in which we are interested, and, on looking round the room to-night, one sees many—in fact most—of the men of the veterinary profession wearing orders of which the profession is proud. They are men who have served their country and helped to build up a Corps which has merited the praise of the world. I couple with this toast the name of a gallant gentleman, who has served in that Corps, and until recently controlled it, a man about whom I do not propose to say one word of praise, for the simple reason that his deeds are recorded in the "Big Book." I refer to our friend, Major-General Sir Layton Blenkinsop.

General Sir Layton Blenkinsop was cordially received upon rising to respond. He said: It has fallen to me to respond to this toast, and at the present moment it is one of the most difficult tasks that you can give any man to perform. We have just gone through the Great War. We have shown the world that we as a nation are superior to any other fighting nation that exists. We have won a great victory. The Imperial Forces that won that victory are fast disappearing. We are told that there is no money

to keep them, and that they have to give way to other calls on the national purse. One of the reasons why we are so very much in debt is because we are not able to get our due rights, which we won by our victory, from a nation which does not and will not pay us unless it is forced to do so.

Turning to my own Corps, the Royal Army Veterinary Corps, I can well remember coming down to this part of the world in 1910 and getting the first people to come together to band themselves into a body, which would support the Army on mobilisation. I can well remember attending meetings of the sections of the National Veterinary Medical Association and asking for recruits, telling you that a great war was probably coming. You laughed at me, but you came forward and put your names down. It was that beginning which allowed our Army to be mobilised, and in the mobilisation of our mobile troops our profession did a great deal. It enabled the animals of this country to be mobilised, and allowed those animals to be collected and kept together in a state of health. The veterinary profession proved in the war that it was capable of anything. I would like to tell you that not only in animal management, but in almost every branch of the military profession, our Corps, the R.A.V.C., stood out, and I think I am right in claiming that it was the one Corps which, throughout the whole of the war, never showed the slightest symptom of insubordination. They were very highly trained; they had to remain back and see other men being demobilised; and they had to take over the animals which were left behind and sell them. That was a very big trial, and those men did it. They did it because their officers were loyal men, and loyal to their Corps. It was that loyalty which we had in the war from this profession that convinces me that, if properly handled, this profession can do anything.

We are told that the next war will be a mechanical war, but I do not quite agree with that. Undoubtedly your transport will be mechanical, but whatever happens there is always this to remember—if you go to war a veterinary service is absolutely necessary. The main wealth of a country lies in its stock. If you waste the stock of a country in the war and conquer that country, that country is of very little use to you. You are losing an enormous asset. Therefore, in my opinion, the veterinary profession, whether it is in a war with animals or with mechanical transport, will always be absolutely necessary.

Our President has proposed three sections to our next Congress. I would like to suggest that he would have an additional section—that of a military section.

The health of "The Retiring President" was proposed by Mr. J. B. BUXTON, F.R.C.V.S., D.V.H., who said: I rise with a very considerable amount of diffidence to propose the most difficult toast during the whole of my career. Those of you who realise that I am merely your mouthpiece will equally well appreciate the fact that the task is surrounded by innumerable difficulties, particularly for the reason that one is torn between pleasure and sorrow—pleasure in having this opportunity given one of expressing, in however inadequate a manner, one's appreciation of the invaluable work which has been done for the Association by Dr. Bradley (applause), and grief in having to make what is actually a valedictory speech.

Probably the minutest percentage of the members of the Association realise the extraordinarily difficult and hazardous times through which we have passed during the past eighteen months since the National was re-organised. It was probably one of the biggest hazards ever undertaken by our profession, although perhaps, unknowingly undertaken. Had one false step been made, the whole fabric would have collapsed. During the short time that the Association has been re-organised, an endeavour has been made to make a substantial foundation: no opportunity has been given for the erection of any spectacular superstructure. The time has been devoted to sheer hard work, unseen, unknown, nevertheless sheer hard work. Probably few people realise that for many hours per day and for 365 days per year an enormous amount of work has been done. The result of that work, thank goodness, is evident to-day. (Hear, hear.)

I have been told this evening by a very honoured and respected member of our profession that this is the best meeting he has seen for forty years. That is evidence of a little progress. If we continue in that way, probably in another forty years we shall not know ourselves. (Laughter.) I want here and now to pay just and fair tribute to the enormous amount of work which has been done by our past President, work which has been done in an unassuming manner, in almost an invisible manner, nevertheless work that has been done, and the result of which is indelible.

In losing Dr. Bradley, by which I mean losing his guidance in an official capacity—we naturally hope to retain his guidance in an unofficial and friendly capacity—we have lost a very great friend. Dr. Bradley always has been an ideal leader, because he has always been there when he was wanted, but his co-workers, who have had their hands pretty full, have not felt his weight unless they committed a *faux pas*. That is probably one of the finest things that can be said of any leader of men, and I, who know, say it of our past President. You know as well as I do the inestimable advantages which have accrued to this Association through the wise guidance of Dr. Bradley.

The toast was received with musical honours.

Dr. O. C. BRADLEY said in his reply: I think you can realise that I am very deeply grateful, not only for the kind things that Mr. Buxton has said, but also, and perhaps more particularly, for the cordial fashion in which you have received them. I do not know that you can quite realise what this particular meeting—a record meeting in the annals of the National Veterinary Medical Association—means to me, for I am pretty certain that there are not many in this room who know the full history, and all the details of the full history, of the re-organisation of this Association.

Nor, I think, do they know with what joy one recognises that this is a record meeting of the National. In the re-organisation of the Association many were concerned who gave their services loyally and freely. I would not mention specific names, but I know that one who is not present this evening was most enthusiastic and energetic in advancing the proposal to reconstruct what was then considered to be an inadequately-constituted Veterinary Association. I refer to Mr. Gofton. There is one in this room who travelled a considerable number of miles in support of the re-organisation scheme, on one occasion—from Aberdeen to Manchester—my good friend, Mr. Howie. I do not want it to be supposed for a single minute that they, and they alone, did the work of re-organisation. There were others in other parts of the country who worked, and worked nobly. There were others, unfortunately, or perhaps I ought to say fortunately, who opposed the re-organisation of the National: some opposed it, doubtless, on what seemed to them to be admirable and sound grounds; others, one fears, opposed it on grounds which, perhaps, could hardly be denominated other than those of prejudice. Criticism was levelled at the scheme. Some of that criticism was destructive: a good deal of it, fortunately, was constructive. Fortunately the criticism, whether it was destructive or constructive, had a marvellously stimulating effect upon the profession as a whole, and one by one, and then by scores, the profession began to think apparently on the lines that if the scheme is worth criticism it is worth consideration. As soon as they began to consider the scheme of reconstruction the victory was won.

Occasionally, very occasionally, there was another kind of obstacle put in the way, which was not so stimulating as criticism, because it was disheartening. That was accusation, sometimes stated directly, but other times indirectly—accusation to the effect that those who wished to re-organise the National were working for their own ends and in their own way, and that that way was not honourable. Fortunately, it was proved that the accusations were without foundation. (Applause.) All these things, as I say, taken together, were exceedingly good, because they finally had the accumulating effect of bringing together the profession, and the determination to re-organise the National, though it took years before it was effected. It was an unfortunate thing that the war put a stop to the consummation of the re-organisation, with the result that we are now only meeting for the third time since the Great War ceased; but I think you will realise it is a moment for justifiable pride on the part of those who took part in the re-organisation of the Association. I am quite convinced that as the years go on that pride will grow and the justification for it will increase. Especially so will that be the case if the Association keeps in the forefront the notion that each is working for the Association, and incidentally for himself, and not for himself and incidentally for the Association.

I want to say, in taking leave of the official position in connection with the Association, that this is at one and the same time a sad and a proud moment in my life, and I want to thank you all sincerely for the loyal support that you have given to a president who has, so to speak, lingered on in the presidential chair for a great deal longer than any president is justified to stay in that position. (Cries of "No, no.") I again thank you for the extremely kind manner in which you have received the toast.

Mr. J. J. AVESTON, proposing the toast of "The Guests," said: It is for myself quite a rare and refreshing privilege to have that task allotted to me. To-night we have as two of our guests Dr. Savage and Dr. Blackett. Dr. Savage we know to be an old and sincere friend of ours. Dr. Blackett has not known us so long, neither have we known him so long, but I am convinced that under the soothing influence of Dr. Bradley he will very soon be just as great a friend of ours as Dr. Savage, and that is saying something. In the Town Clerk of Bath (Mr. J. Basil Ogden) we also have a really good friend of the veterinary profession. I have been honoured as the successor to Mr. Scott in presiding over a most able body of gentlemen in connection with the arrangements for this conference. Very valuable services have been rendered by Mr. F. Tonar, Major Taylor, Mr. Adams, and last, but not least, I must mention the pivot of the whole thing—an enthusiast and optimist of the first water—Mr. Stableforth. (Applause.) I couple with the toast our new friends, Dr. Blackett, M.O.H. for Bath, and Captain F. H. Storr, O.B.E.

Dr. BLACKETT, who first responded, said: People do not realise that the prosperity and the happiness of the nation really depends, at least I think so, very largely upon the public health. Still less do they recognise that this vast and complicated subject has constantly received many contributions from veterinary science. There is no doubt, speaking as a member of the public, that we as a community owe a great deal to the work done by the veterinary profession. One could give many examples. Take a thing like that terrible disease hydrophobia, for example. It is stamped out in England, and why? Because, many people would say, of the wisdom of Government departments; but their wisdom was merely acting on the advice of skilled veterinary surgeons, who knew of the danger, and the Government acted upon their advice. That is merely a single example, and one could give many more in connection with the diseases common to man and to animal. I will stop at that, but I merely wanted to emphasise the fact that Dr. Savage and myself do realise that the veterinary profession has done a great deal of valuable work for the public health. I thank you for the very kind way in which you have received this toast, and for the kind remarks Mr. Aveston has made in proposing it.

Captain F. H. STORR also responded. He said: I do not know why I have been asked to reply to this toast, as I have no special qualification for replying at this moment, except that I represent in a way the oldest Agricultural Society in the kingdom, and, therefore, if Bath claims to be the oldest veterinary city in the kingdom, perhaps it is fitting for me to

say a word also. I am sure I am speaking for every guest here when I say that we all appreciate the honour of being asked to be present. What has struck me during the week and during this dinner has been the extreme modesty with which the members of your Association treat their own claims to consideration. A good deal has been made of your contributions to the public health, but nothing has been said of your contributions to the public purse, because the export trade of British live stock is very important indeed to agriculture, and you are the safeguards of that export trade. If the legislation which is threatened bears fruit in the near future, you will also have still further burdens put upon your shoulders. That reminds me of the military achievements of your profession during the war. I met a member of your Association who was put in charge of a remount ship coming from India. He had something over 1,000 remounts on that ship, and by the exercise of extreme care and precautions he arrived at Marseilles with only one death, and as there was a foal born on board during the passage, he claimed to have had no losses at all. (Laughter.)

Mr. A. E. ROBERTS, M.R.C.V.S. (Chepstow) suitably proposed the toast of "The Ladies," acknowledging the valuable services in connection with the social arrangements made by Mrs. Aveston, Miss Stableforth and a band of willing helpers, and Mrs. Aveston and Mr. Robertson (Tunbridge Wells) responded.

The National Anthem, sung just after midnight, concluded a most successful and enjoyable function.

THE CLOSING MEETING.

Votes of Thanks.

The concluding meeting of the Conference was held on Thursday, August 3rd, at 4 p.m.

The retiring President (Dr. O. C. BRADLEY): It is with peculiar pleasure that I perform the last office of President, peculiar pleasure in this sense, that I am going to induct into the chair one who is worthy of sitting in that chair, and one who is well known and a friend of all of us. (Applause). I hereby formally—I need say no more—ask Mr. Henry Sumner to assume the office of President of the Association. (Applause.)

The new President, Mr. H. SUMNER (on taking the chair): My position in life must be getting more important in the profession, but in that importance it becomes more difficult to the individual. What I have done to merit the honour which you have done me I cannot tell, but I take it that some of my actions in life appeal to you and that you expect me in some measure to be able to carry out the functions and duties of this high office. Now, following Dr. Bradley, the office is immeasurably increased in importance. We all know his charm, his personal charm. We are also conscious of his culture. I can only try to fill the gap, as gap it must be, but with your co-operation I shall hope to render a satisfactory account of my stewardship. In the words of the Minister of Agriculture, "I hope to do my duty," and I hope the exercise of that duty may be acceptable to the Association. (Applause.)

The President, continuing, said: On the agenda placed before me, it is my honour to offer a vote of thanks, an expression of the earnest thanks, to our retiring President. I have said something—I wish I could say more—to convey to you all that he has done for the Association. I think I am right in claiming on his behalf that he was the instrument which has reformed this Association. It was his work, not of days or even weeks, but of years. I happen to know some of the difficulties which he and those whom he was fortunate in having to work with went through before they produced a scheme satisfactory to the defunct Association. He worked with discretion and brought forward a very great asset into our professional life and atmosphere. I give you the opportunity of expressing your heartfelt and sincere thanks to our retiring President, Dr. Bradley. (Loud applause.)

Mr. PILLERS: I have been asked to propose a vote of thanks to the executive officers for the work they have done during the past twelve months. I feel it a very great honour to propose this vote of thanks to the officials. Good wine needs no bush. We all know the difficulties, and that every official cannot please everybody. Very often very good officials displease a good many. In the case of the Secretary and Treasurer, if we do not always see eye to eye in some cases with what they have done, we know they are a success and acting in the way they think best and in the interests of the Association. I move a hearty vote of thanks to the officials for their arduous services and cordial work during the past twelve months.

Mr. J. BASIL BUXTON (General Secretary): I need hardly say I thank you very sincerely on behalf of the Executive Officers for the vote of thanks you have passed here to-day. They all worked, of course. They were supposed to work. But they also get rewards, and this meeting is more of a reward than you have any knowledge of. We appreciate the large numbers who have turned up this year, and the enormous amount of energy that has been put into the work of preparing these meetings by our friends here, and also we appreciate the extreme generosity that has been shown to us.

Mr. W. WOODS: I wish to propose a vote of thanks to the Provisional Committee. Upon that depends the whole success of the meetings. No one knows how much work Mr. Aveston and Mr. Stableforth have put forward to make this meeting a success. (Applause.) Mr. Adams required special mention because of that cow which he bought and presented to the Association in order that the operation could be demonstrated. Mr. Adams deserves a special vote of thanks. There are other gentlemen I wish to mention. I refer to Major Taylor and Mr. Tonar, who have worked exceedingly hard on the Provisional Committee to make the meetings a success. The meetings have been a great success.

Mr. ROBERTS: We do not desire to forget the Ladies' Committee. What has been accomplished

by them has entailed an enormous amount of work. I will give the names of two. Mrs. Aveston has been most charming and kind to all, and has lost no opportunity of doing anything to enhance our comfort. Miss Stableforth has put in hours of secretarial work. She has paid visits to Bath to make arrangements. and she has carried out a great deal of work which has been of enormous service to the Association. She also has been very charming. I wish to express our very best thanks to all the ladies for all the kind things they have done. (Applause.)

Mr. BEGG: I think I may say that the profession is at all times grateful for anything that is done to relieve the difficulties of their arduous lives. To the City of Bath, Mr. Hatton, and Captain Lewis, his assistant, we all owe a very sincere debt of gratitude for the trouble they have taken in looking to our convenience and pleasure.

Mr. SLOCOCK: I propose that a very hearty vote of thanks be accorded to the Mid-West, South Wales and Western Counties Division for the great trouble they have taken in providing us with entertainment. Other speakers spoke of realisation, but I speak of anticipation, but I am sure we shall all enjoy their hospitality later in the day. I wish to mention two names—those of Mr. Rees and Major Haskins. (Applause.)

General Sir L. J. BLENKINSOP: I have to move a hearty vote of thanks to the readers of papers, the leaders of discussions, the operators and demonstrators. You all agree that the papers have been of a very high standard. They show an enormous amount of work, and that work has been often done by men in busy practices. It seems almost impossible how they found time to do it. The openers of discussions have given us without exception constructive criticism. They have been discussed in a kindly way, and have helped to carry on the discussion of the papers. The work of the operators and demonstrators was all fully appreciated. Some complained of the want of discussion. That cannot be due to want of appreciation, but want of time. We have rather overburdened our meetings in the short time at our disposal.

The PRESIDENT: Any other business?

General Sir L. J. BLENKINSOP: There is one proposal I would like to make. I believe that for this meeting we sent on invitations to the National Veterinary Association of America to send delegates. I believe this was greatly appreciated. I propose that at the next meeting these invitations should also be sent to France, Italy, Canada, Australia and S. Africa.

Mr. PILLERS: I second, and ask that you will add Belgium.

This was passed.

Bovine Mastitis.

By F. T. HARVEY, F.R.C.V.S., St. Columb.

(Presented to the N.V.M.A., Bath, August, 1922.)

GENERAL REMARKS.

The placing of a paper before the Annual Meeting of the National Veterinary Medical Association is an event not lightly to be undertaken, and I do so with some amount of diffidence. There seems to have been a fairly wide expression of opinion amongst veterinary surgeons that the subject of Bovine Mastitis was one eminently fitted for discussion, since the disease is of great importance economically, baffling medically, and of great interest surgically.

Few diseases demand a wider range of study in developing their natural histories, and so many factors are brought into play in its evolution, under varying conditions, that it becomes impossible to deal adequately with them all in a single paper. The problem of treatment or management of mastitis is the one which, with the practising veterinary surgeon, overshadows all others, and it is of paramount importance at the present day. It would be impossible for a general practitioner to add anything to what is already known regarding the bacteriology of the mammary gland, or the morbid changes brought about by the presence and growth therein of pathogenic or saprophytic organisms. There would appear to be no bacteria special to the milk apparatus of the cow, the flora being common to the infections of the body generally, although it is possible and probable that certain strains of organisms may grow there more readily and produce more mischief than others. The bovine mammary gland is, however, conspicuous amongst the parenchymatous organs as the one most influenced by environmental conditions, and as one where functional activity may be readily made to outrun purely biological requirements; and it is at the same time the most vulnerable of tissues to outside attack, not only as to the grosser kinds of traumatism, but to the more insidious forms of bacterial invasion, and we thus see existing here two prime pre-disposing causes of disease; excessive development and function, and an easy vulnerability. Allusion has already been made to the economic aspect of mastitis and much might be written on the question, for it is one of those problems which will ever assume a growing importance, as it is unlikely that the State will continue, indefinitely, to allow cows affected with disease of the udder, in whatsoever form, to remain associated with the public milk supply; and it will thus be necessary for the veterinary profession in the future to attain the highest possible efficiency both in the prevention and treatment of the condition.

The diseases of the mammary gland in most animals or females assume a secondary importance compared with the diseases say, of the lungs or of the digestive tract; but in the dairy cow they become of first-class importance. The outside situation of the organ renders recognition by the layman of structural changes occurring in it, or of alteration in the secretion, more or less easy, so that the ready discovery of something being amiss is favoured, and this should prove of considerable help in determining correct and early treatment and management of the disease; but as a matter of fact, the effect is quite the opposite in many instances, for it is a curious point in animal therapeutics that those diseases which may be easily and definitely recognised by the layman or owner, become frequently the most mismanaged and neglec-

ted, and they likewise afford the patent and quack medicine vendors a happy hunting ground for the distribution of their wares, and nowhere do we find the fraternity more pushing than in the case of mastitis.

The udder of the cow has to some extent become an abnormality. For its modern work as a food factory on excess duty its position is bad, and some hygienists would prefer it to be located at the other end of the animal; and, moreover, its physiological activities frequently attain such proportions that not only does it become disposed to inflammation, so-called, but it also becomes associated with a new set of diseases altogether, a family of maladies of which our old friend milk-fever may be regarded as the type. In most glands doing a large amount of work the secretion as it is formed is carried away, or stored at a safe distance, as seen with the urine and bile, and infection of the contents of either of these cisterns may leave the working cells of the associated glands quite unimpaired for long periods. But there is no protected or guarded route between the galactophorous sinuses and the gland acini, so that the parenchyma of the organ becomes quickly involved in any bacterial pollution of the milk in the receptacles.

Then, again, organs generally have some form of limiting membranes or capsule, or associated mechanism, controlling their volume. The udder is uninfluenced by the compressive or expansive actions of the voluntary, respiratory, and visceral muscles so important in regulating the circulation generally. "It is a fundamental principle in the construction of the body that the cells are enclosed by membranes which permit inhibition of fluid but check swelling, thus enabling them to work and at the same time receive an ample supply of blood."—Leonard Hill, Hunterian Lecture on "Blood Vessels and Pressure." This principle seen in the salivary glands, liver, kidneys, and testicle, is departed from in the case of the mammary gland, and especially so in that of the cow. Here the white fibrous unyielding capsule of glands generally is replaced by one composed largely of yellow elastic tissue, and thus is permitted the great variation witnessed in the size of the gland during work and at rest. All these points are to be considered in dealing with disease of the mammary apparatus and in that of the cow more particularly. For long periods the organ, in a high-grade cow, may be working at the highest possible pressure, and then comes a period of functional inactivity, and with this there is, in addition, the daily or hourly variations in pressure, both secretory and vascular, during the active stage of lactation, and occurring to a degree surpassing probably that witnessed in any other gland; in fact, one might say that the range of variability of conditions under which the cells of the mammary gland of the modern cow work, is greater than that which obtains with the cells in any other tissue.

We see, then, unusual conditions normally existing in the udder of the cow, and incidentally we find special characters manifested in diseased states of the organ. A reflection of this latter statement is to be found in the great variety of agents used in treatment, and the differences expressed by practitioners as to the value of any particular line followed, the therapeutical history of bovine mastitis being a medley of pessimism, success, and failure, of loose statement and extravagant claims.

In studying a disease it is advisable from time to time to review or take stock, so to speak, of the position of our knowledge concerning it, and in none can we do so with greater advantage at the present time than with the malady, or infections, we are wont to term mastitis. The least studied forms of disease are, often enough, those which are always with us, the so-called everyday ailments, and we must include mastitis amongst them; for, although a good many descriptions of the bacteriological characters of the bovine forms have appeared from time to time, clinical, biological or therapeutical considerations have received scant attention as a rule. The disease is one in the study of which the development of team-work, or the group system of inquiry, might with advantage be applied. It is too important a condition to depend for advance on individual or spasmodic effort, and there must be a combination of practitioners and laboratory workers in evolving treatment and control. Tuberculous mastitis has been excluded as not coming within the scope of the paper.

Nature and Classification.

The discussion of the pathology of mastitis must be left to the trained worker in comparative pathology. In what we might term the old view of the condition we were chiefly interested in the diseased structures themselves, and mastitis was described in words dependent on the local changes induced, but to-day we are more interested in processes, that is, the influences which the causes of disease have upon functions and structures. Thus, instead of regarding mastitis according to the tissues involved—parenchymatous, interstitial, etc.—it is better to speak of it in terms of infection, for we should begin to deal with disease before (if possible) extensive anatomical change has occurred in the organs; for a pronounced pathological anatomy of the udder means an equally pronounced therapeutical failure there, either on the part of the natural defences of the cow herself or of the measures comprised under the headings of medicine and surgery.

There are two ways of looking at mastitis: firstly, that it is a disease, of which the signs are of bad omen, to be got rid of at any cost and at the earliest possible moment, either by hook or by crook (old view); secondly, that the bacterial invasion of the udder is the disease, and that what we term mastitis is merely the outward or local expression of natural curative reaction going on there concurrently with changes in the tissues and blood generally, and that this is necessary to assist the cow in overcoming her infection, and therefore to be encouraged in a rational way. All this sounds revolutionary, but it is quite in keeping with modern ideas of immunity and the biological

side of the present day conception of inflammation, and, moreover, it is further supported by practical experience in the management of cases, and therefore seems the truer interpretation of the condition. In the defensive reaction to an infection of the udder, as with other tissues, there are three processes involved: local swelling or exudation, fever, and, when these fail, pus formation, and we see them practically all three in every case of udder infection of any severity and duration. The presence of pus in the udder means often that the infection has gone in favour of the cow, but at considerable cost to the gland. Some such view of the nature of mastitis is, I think, necessary if any substantial advance is to be made in the future in regard to the treatment of the disease. Two points deserve mention: the mammary gland, unlike many other organs, is unnecessary to the continuance of life and is therefore placed outside, or in a more or less exposed situation, and thus becomes incessantly open to bacterial attack, more especially in the dairy cow; and also the fact that the secreted milk while within the gland possesses the qualities of a living tissue, and as such is capable of exhibiting bactericidal properties. Therefore we must not conclude that organisms are able to multiply in milk contained within the gland reservoir as they do in milk immediately after it is withdrawn therefrom. It is this power of the milk *in vivo* which is so largely responsible for the maintenance of the practical or clinical sterility of the galactophorous sinus. The use of the term clinical sterility seems admissable in connection with the milk gland of the cow, for undoubtedly, in many instances where the udder is inflated for milk fever or otherwise explored, bacteria are already there, but they remain harmless, as a rule, if no further implantation of organisms occurs.

Investigating the bacterial contents of the udder, D'heil, of the Hygienic Institute of the Berlin Veterinary School, amongst other conclusions gave the following:—

(1) In cows which are regularly milked and are kept clean no plug of dirt is usually to be found on the opening of the teat. In cows which are not milked such a plug is usually to be found. The formation of the plug usually requires some days. and its bacterial content increases with time.

(2) The teat canal and milk cisterns generally contain bacteria.

(3) The bacteria to be found in the milk within the udder obtain entrance through the opening of the teat.

(4) The gland-tissue of the udder contains bac teria, though in small number.

(5) The gland-tissue of the udder possesses a strong bactericidal power.

(6) The first jet of milk withdrawn almost always contains the greatest number of bacteria.—*J.C.P.T.*, vol. 19, p. 51.

It is only when mass infection takes place or virulency is high or immunity falls, that successful organismal invasion of the gland is likely to occur. But if infection of the sinus does happen and organisms once obtain a hold in it, the results are disastrous, as the milk then becomes an excellent culture medium. It seems better, therefore, to adopt a classification having an etiology basis rather an anatomical one. With the latter we have had the catarrhal, the parenchymatous, the interstitial, the pustular, and the gangrenous forms, amongst others; and arrangements still more elaborate have been attempted by certain writers. The use of anatomical qualifying terms, however, in mastitis is of some value, and they will doubtless continue to be used for a long time to come. It does not matter so much what terms are used so long as the true conception of disease is kept in view. It appears that organisms which have succeeded in passing the teat defences and become attenuated may continue to lead a harmless existence in the udder and also that other organisms may continue in the gland as survivals of a previous infection and form reservoirs for still other infections at a subsequent date, points which are intimately connected with the carrier question.

Sven Wall divides udder infection into two main classes: milk or parenchymatous infection, and stroma or interstitial infection; and he states that in the former bacteria are only found in the milk, and in the latter organisms are only found in the stroma or interstitial connective tissue. To assume that there is ever such a limited distribution of organisms in an udder infection is entirely without reason, for it never occurs. It would be much simpler and more correct, I think, to say that in the one case the predominant reacting tissues belong to the parenchymatous order, and in the other to the interstitial or supportive elements, and that it is quite unusual for any case of udder infection to limit itself to one order of tissue to the entire exclusion of others. If organisms were only found in the milk it should be an easy matter to destroy them by the intra-mammary injection of suitable germicides, but both experimental and practical evidence clearly proves that prompt lymphatic invasion always occurs in such cases, and that it precedes the occurrence of inflammation. The precise form the mastitis will assume in a successful infection, and also its severity, will depend largely upon the stage of lactation, the virulence of the invading organisms and the degree of immunity possessed by the cow towards the particular infection. Here again there is some resemblance between lobar pneumonia and certain cases of mastitis, for both diseases may attack and kill the strongest subjects.

Although an attempt to differentiate the various udder infections may be made in writing a paper, in practice one can only surmise and speculate in making a diagnosis as to the particular form of infection present, and perhaps in the majority of cases we have sooner or later mixed infections established. The bacteriologist alone can give us a definite diagnosis, but we have to proceed with the treatment of the case irrespective of this information, at least in the early stages, and rely on general principles and stock, or polyvalent vaccines, etc.

Adopting no particular classification, allusion may be made to some forms of infection met with in the bovine udder.

Staphylococcal infections are said to be milder on the whole than those caused by the streptococcus, but I have seen some of the most severe cases of mastitis, especially in recently-calved cows, determined by S. pyogenes aureus and ending either fatally, or in necrosis of the quarter or quarters, and without pus formation. In a recent fatal case the sinus walls presented a yellowish leathery appearance and were greatly thickened. The teat had been amputated without benefit.

Dr. W. G. Savage (*J.C.P.T.*, vol. 22) investigated thirty-six cases of mastitis from different parts of the country and found 16 per cent. due to staphylococcus, 75 per cent. to streptococcus, and 3 per cent. to B. coli. He states that in the cases due to staphylococcus, as a rule, one quarter only was involved and they were mostly mild; but it would seem that further investigations are required in determining the general character of this form of udder infection, as Savage was probably always dealing with more or less chronic cases, and we know that acute staphylococcal infections may be very intense—for example, a large carbuncle. MacCallum (Text Book, Pathology) says:—"There is a local character in the lesions they produce in contrast with the more spreading lesions of the streptococcus. No matter how extensive the lesions, they have the same general character of concentration which makes possible the liquefaction of the tissue and exudate." Discussing local injury during the course of such infection he lays stress on the necessity of avoiding any further damage during treatment, as extension of the infection will result or become inevitable. General distribution of staphylococci through the blood-stream also occurs readily from local infections, points which are to be remembered in the treatment of acute cases of mastitis. Staphylococci belong to the class of pathogenic bacteria which produce endo-toxins and little or no toxin or ecto-toxin; therefore in the treatment we have to rely on vaccines and phylacogens, etc., rather than on anti-sera, or injection of serum.

The pathology of an acute coccal infection of the udder, according to Adami, would be somewhat as follows. For the first twelve to twenty hours little or no evidence of local reaction would be noticed, but the cocci would be proliferating and spreading into the lymph spaces. The growing cocci, as such, cause very little irritation. Only a few hours later do we see an active attraction of leucocytes, and this is determined by the death or breaking up of some of the cocci and the liberation of endo-toxin. It is this latter which attracts the leucocytes and causes the irritation. "Whatever the cause, once leucocytes are attracted to the area they ingest sundry of the cocci, and then digesting them, split up their proteins, thus liberating their soluble and diffusible endo-toxins. These, diffusing, cause dilation of the surrounding capillaries, and migration from them of more and more leucocytes, with more and more phagocytosis. Many of the polynuclears in the centre of the area are destroyed by the strength and concentration of the endo-toxins. The endo-toxins, diffusing out, gain entrance into the lymph and blood and set up disturbances at a distance, with febrile symptoms. At first the cocci were attacked by non-specific lysins, the common proteolytic enzymes of the leucocytes which had engulfed them, and to these non-specific enzymes (lysins of the first order) is due the liberation of the highly toxic endo-toxins. Later, if we may reason from analogy and employ the results obtained in studies upon the parenteral digestion of foreign proteins, the leucocytes and other body cells which have absorbed the poisonous split proteins develop specific enzymes (lysins of the second order) which break these down into harmless substances. It is with the production of these specific lysins in excess that the body overcomes the bacteria, that the febrile process comes to an end, and healing ensues."—Text Book of Pathology, Adami.

This, then, is the method of invasion and cure of coccal mastitis, and in all our measures we can only assist in the process. Unfortunately every curative reaction is liable to fail in effecting its purpose and to get out of hand through its very intensity, and yet again the local reaction may not be developed until after the cocci proliferating have been carried into the blood-stream and a general poisoning occurred. In such cases the virulence of the infecting organs repel the phagocytes or kill them at once.

If the cow survive a severe infection the usual termination is necrosis of the affected quarter or quarters, or abscess formation.

Streptococcal Infection of the Udder.

In examining a large number of udders a proportion of the quarters will be found somewhat more fleshy than others, and though one might hesitate to say definitely that such quarters were diseased, yet probably they are often examples of a very mild streptococcic infection, in fact, one might say that the pathological anatomy of streptococcal infections may vary from the almost unnoticeable to the most intense reactions. Undoubtedly the larger number of cases of mastitis are caused by this infection, and it is the form which exhibits definite epizootical tendencies, sometimes spreading through dairies, and caused by S. mastiditis. In general streptococci exhibit a greater tendency to spread along the lymphatics and attack or infect wider areas than staphylococci, while udders are said to rid or clear themselves of the latter more frequently than when infected by the former. Both vaccines and anti-serum treatment are available for this infection. It would appear that we have much to learn yet regarding these two forms of udder disease, and that in acute mastitis occurring in the early stages of lactation they cannot be differentiated clinically. Streptococcal infections of the udder assume considerable importance in regard to public health, but apparently it is not the bovine form of streptococcus which causes disease in man.

Coli Infections.

Udder disease due to invasion of coli-like organisms is apparently not very common. Sven Wall states

that in general these infections bear a very close resemblance to those caused by the staphylococci; that the prognosis is always good except in cows which have recently freshened, and it then becomes unfavourable. Considering the very filthy conditions under which some cows are housed it is a wonder these organisms are not more often found as causing mastitis. They are pyogenic. Anti-sera have not proved of value, but autogenous vaccines have been successful in some cases. Other forms of udder infection may be met with, but it is unnecessary to refer to them all.

Primary Anaerobic Infections: Gangrene.

In some instances it is obvious from the commencement that gangrene is present. It is to be distinguished from necrosis occurring during the course of the other infection, is highly infectious, and as a rule runs a rapid course, especially amongst ewes. There are two forms in the cow. In one there is a tendency to prompt arrest for limitation of the gangrene following death of the teat and more or less extensive areas of skin, with little or no gas formation. A line of demarcation is formed with a suppurating zone. Fever soon disappears and the cow suffers little, the dead parts being thrown off. The second form spreads widely, kills quickly, and there is much gas formation. Death may supervene in a few hours.

In a recent discussion on mastitis early slaughter in these cows was advised. I regard such cases as unfit for food. Free incisions and drainage promptly carried out may arrest the process and save the animal. Ablation of the udder is sometimes said to be successful. It must be carried out early. This form of gangrene sometimes follows udder inflation for milk fever where the syphon has been contaminated.

Etiology.

It is not always possible to separate pathological processes from purely etiological factors. Actually the cause of mastitis is a matter of bacterial growth, and the disturbances resulting from such growth constitute the disease; but although the direct cause of mastitis, we find organisms do not always induce serious tissue change where they reach the udder, and therefore there are other factors to be considered. In the experimental production of mastitis induced by the direct injection of virulent organisms by way of the teat duct, they would practically always get positive results, but such a massive introduction of infection never, or rarely ever, occurs naturally; but such an infection is sometimes induced by accidental inoculation of the lacteal duct with tainted syphons, etc., and in such cases the base of the teat is usually indurated by the third day. There are many points to be considered in a discussion on the etiology of mastitis.

Traumatism.

It is probable that direct injury plays a very small part in the development of mastitis, though it is impossible to entirely exclude it as a factor in its etiology. The extreme distension or stretching of the tissues which occur with inflation of the udder in the treatment of milk fever, is a border-line traumatism, and yet as a cause of mastitis it does not exist; there is probably here, however, more or less exsanguination of the udder, and there is therefore little tendency to extravasation of blood into the tissues, for it appears that injuries accompanied by hæmorrhage into the deeper parts of the milk gland are liable to be followed by infection. Traumatism only indirectly favours invasion. A form of traumatism occurs with hard milkers and is manifested by the more frequent occurrence of blood in the milk in these cows. But, curiously enough, in one outbreak of contagious mastitis it was found that the period of incubation was shorter with easy milkers than with those which were hard, being six to eight days, and nine to twelve days respectively. This obviously suggests that easier elasticity of the sphincter in the former favours passage, and more than counterbalances infection by pressure, in the milking of hard cows.

Chill.

What is chill? The term is employed by many, but few would use similar language to describe the meaning the term conveyed to their minds. It may be assumed that the regulating thermal mechanism breaks down, and that the body cools on the surface, or a sense of coldness becomes appreciable notwithstanding that the internal temperature may be all the time rising. Tissue invasion by organisms always at hand is thus favoured and disease begins. In the cow the udder becomes the "seat of election" of disease established by chill more often than do other organs, just as in man we find pneumonia developing in similar conditions. The udder is well placed to become the subject of chill, and its great importance in the economy of the cow, especially from the bio-chemical point of view, determines its choice as the seat of the expression of chill in so many cases.

Flies as Factors in Propagation.

The important rôle attributed to flies in the spread of various diseases is generally recognised. They are notorious germ carriers, and from their frequent passage from infected surfaces directly to the cow's udders and especially to the integument around the nipples of the teats, we must regard them seriously as factors in the spread or causation of mastitis. Here again it is probable that the easy cow is the one most readily infected by flies. She has a finer integument, as a rule, and a more distensile teat sphincter. Direct lymphatic infection by flies must, however, occur around the point of the teat apart from entry of organisms through the duct opening. Fly infection may therefore occur in two ways; in the one the microbes are merely spread over the external opening of the duct, and ultimately find their way through the opening; in the other they are directly introduced into the terminal lymphatics of the skin papillæ. Successful inoculation by the

latter method is perhaps of more rare occurrence than by the former, since the few organisms introduced would be doubtless quickly destroyed, or rendered more or less inert for a time, at least, while organisms entering the teat channel direct would find conditions more suitable for growth and aggressive action, and this consideration obtains in all forms of teat duct infection. It is possible that fly infection of the lymphatic system may be responsible for some of the nodules sometimes felt beneath the skin above the base of the teat.

Contagion.

Many outbreaks of mastitis assuming a definitely contagious character have from time to time been recorded, but the disease is more often seen in the sporadic form. All cases, however, are to be regarded as more or less infectious under natural conditions, and the streptococcal forms are those which most often exhibit definite epizootical tendencies. Carré, however, has described a contagious bacillary form of mastitis (bacillus mastiditis contagiosæ), but he regarded it as of "only restricted importance for prophylactic measures, and the treatment of inflammation of the udder remains the same whatever the causative agent may be."

Accounts of outbreaks of contagious mastitis in cows are contained in the "Journal of Comparative Pathology," vols. 11 and 15, by Malcolm, Radway, and Riddock. Cows may be infected and yet exhibit no change in the udder, which may be detected by external manipulation. In Riddock's case in-contact cows became infected from the tenth day onwards, but Radway places the period at fourteen days. In the majority of cases of mastitis the result of contagion, the general symptoms do not seem to be severe. "The cows did not suffer much in general health."—Riddock. This is in keeping with my experience, but in a few instances where mastitis has exhibited a tendency to spread, and in a connection with any eruptive disease of the udder such as cowpox, the general systemic disturbance has been much more severe, and, of course, transmission is easy under such conditions.

The Efficiency of the Defence Mechanism.

(1) *The teat sphincter.* Lister long ago pointed out the almost complete protection against germs afforded the tissues by two healthy mucous surfaces normally enjoying complete contact, and accordingly we find the efficiency of the teat sphincter very high considering the extraordinarily favourable conditions for the growth of germs on either extremity of it. At one end there is often dirt or fæces, at the other an almost perfect culture medium—milk; and these conditions may continue in existence for years, and no apparent bad results are seen. On the other hand the momentary passage of a dirty teat syphon may lead to the destruction of the cow. Any instrumentation involving passage of the teat sphincter should be carried out with considerable caution, and a rigid asepsis observed. It would appear that notwithstanding the natural efficiency of the sphincter, passage of microbes not infrequently took place, but that usually such microbes are quickly destroyed or rendered harmless. It was only when germs of high virulence entered, or the local defence fell, that infection followed. For practical purposes they could therefore regard the udder under normal conditions as clinically sterile.

(2) *The Blood and Lymph Supply.* The amount of blood passing through the udder tissue in cows is extraordinary, and thus a high bactericidal power is maintained in all the tissues and fluids. Entering germs normally meet with short shrift; they are swept away and destroyed, and thus the integrity and utility of the gland is preserved. The excessive but necessary development of the vascular system of the cow's udder explains the caution essential in the use of the knife in diseased states of the organ. The lymphatic system of vessels is correspondingly developed and its importance in mammary pathology has not been sufficiently emphasised. Sven Wall limits his description of the lymphatic vessels and their glands to three lines, and yet they must play an important part both in preventing and overcoming infection.

(3) *Lymphatics of the Skin.* Recent work on the lymphatic arrangement of the skin has been done by Professor Handly Sampson (Hunterian Lecture, "Lancet," Nov. 26th, 1921). According to Sampson each skin papilla has a central lymphatic vessel like the lacteal of an intestinal villus, and the arrangement is well seen in the nipple. Organisms entering the lymphatics of the papillary layer pass down in vessels having few anastomoses, and enter the deep plexus of lymphatics everywhere existing on the fascia beneath the subcutaneous layer of fat, where they are as a rule destroyed or rendered harmless. According to this author the skin is divided into independent lymphatic areas whose only lymphatic communication with each other is by way of the deep plexus above mentioned. Infection may spread in any direction once an effective invasion of this plexus has taken place. The arrangements for phagocyting bacteria introduced by flies, etc., around the apex of the teat must be effective considering the almost continuous nature of their attack during warm weather. Spread of infection by lymphatic channels from one quarter to another is not infrequently seen in severe infections, and is always serious. In these cases the inflammatory œdema spreads over the adjoining quarter, invasion of the parenchyma being from the periphery. It is the subcutaneous fascia and the large lymphatic plexus which must be divided if we are to relieve tension and drain off serum, etc., from the enormously swollen udders, in that form of inflammation which has been described as lymphangitis or panmastitis, and the only alternative treatment seems to be amputation, if life is to be preserved.

(4) Organisms which succeed in passing the sphincter and if of low virulence are, as a rule, rendered harmless by wandering cells and bactericidal substances secreted by the mucous membrane or gland cells. It is an ascending infection, and there is always a certain amount of lymphatic invasion in such cases, and this in turn attracts leucocytes and these act as

guards to the milk gland above. There is therefore a sort of double mechanism or dual defence against organisms reaching the gland from the outside. When organisms of high virulency enter the duct, or the defence otherwise breaks down, the first stage of infection is often indicated by a swelling at the top of the teat, a localised cellulitis, which invades the whole quarter more or less rapidly.

Foci of Infection and Infection by Blood Stream.

The most probable source of udder infection from within is to be found in the genito-urinary system, and metritis the chief cause. There are two possible routes or paths of infection: one by way of the vaginal opening, skin and teat; and the other by the blood-stream, or, possibly, by lymphatic channels.

When disease of the udder follows retention of the after-birth in cows it is difficult to exclude teat infection; but there is not infrequently some evidence of lung trouble when infection by the hæmal route has taken place. As old age advances the possibility of hidden centres of disease existing within the body is to be remembered, but they often enough only become manifest at post-mortem examinations. I have seen gangrene determined by old necrotic centres in the liver, result of an earlier fluke infestation. But mastitis arising in this way is not common.

Retained Milk Secretion and Retention Mastitis: Galactocele.

The facility with which the cow is able to disperse or reabsorb milk from an over-distended udder with an obstructed duct, or an udder not otherwise relieved, is remarkable. The accumulation in such cases becomes a true galactocele, and behaves as other kinds of cysts, whether of serum or of blood. When the tension reaches a certain height no more milk is secreted, cells begin to atrophy, and there is a gradual absorption of the milk, and at the end of thirty or forty days complete involution has taken place and all the milk has disappeared. For such a process to succeed there must be an effective sterility of the whole gland, for if any infection takes place during the process, the results are frequently disastrous, and we get the so-called retention mastitis, and in some instances gas formation. Allusion will be made to the form of retention mastitis seen in fattening cows. It is probable that inflammation or mastitis never develops solely from retained milk, but that the condition predisposes to infection. Any wounds or eruptive conditions existing on the udder during the period of milk absorption may readily result in deep infection, and such conditions (wounds, etc.) should receive due attention. A very old belief exists among the laity that in cases of retained milk secretion there is a danger of the milk "flying over the body." It does seem possible that the parenteral digestion of a fairly large quantity of milk, over a period of time, might throw the cow into a state of anaphylaxis.

The Carrier Problem.

One of the most interesting problems in connection with bovine mastitis is that concerning the bacterial content of the apparently normal udder. It was formerly supposed that such udders were sterile, but evidence is accumulating that the majority of them are only relatively so. In the greater number of cases, however, the bacteria present are merely harmless lodgers, leading a passive existence as long as the udder immunity is maintained at a normal level. It is when the latter falls, say from chill, or other depressing influences, or a new mass infection takes place, that such micro-organisms may play an important part in udder infection. Here again we find an unusual feature in the field of comparative pathology in connection with the mammary gland or sinus rather, of the dairy cow, its bacterial flora being consistently richer under so-called normal conditions than probably that of any other gland of its kind.

It has been found in cases of mastitis involving one or two quarters that organisms apparently identical with those inducing the infection may be found in the milk from the unaffected quarters. This is an interesting point, and seems capable of two interpretations: either the organisms have by some means been transported, say, by the phagocytes from the diseased to the healthy quarters and then found their way into the milk sinus; or, that the gland as a whole has been harbouring germs for an indefinite period, and that for some unknown reason they have assumed an active phase in the diseased quarter or quarters. The latter seems the more probable explanation, as otherwise there would be evidence of active infection in all the quarters. There is a marked tendency for certain organisms which have once reached the mammary tissue to linger there and to remain as potential sources of infection waiting their opportunity. A lung which has survived a lobar pneumonia becomes clear of the causative streptococci and its products, while the udder is frequently unable to clear itself from a similar attack. As already stated, outbreaks of mastitis have occurred in herds following the introduction to them of fresh cows, with apparently normal udders, and there seems here a point in preventive medicine which has not received sufficient attention, such as the isolation of, or the testing of the leucocytic content of the milk, etc., of newly-purchased cows before the latter are mixed with the general herd.

Much that is peculiar in the pathology of disease of the udder seems definitely associated with the germ-carrying capacity of the organ. A cow during a lactation may show indications of infection in one quarter, which goes dry. At the succeeding calving this particular quarter may give milk of fair appearance, but in the meantime another quarter has gone wrong, and so on, and such udders are probably to be regarded as carriers. A somewhat similar history is associated with that rather common condition of obliterated or occluded lacteal duct. In these udder cases, not infrequently there has been an unrecognised mild infection of the mucous membrane lining the teat canal during the previous lactation, and the two roughened surfaces lying in contact during the dry period adhesion takes place and the duct is obliterated. Here again the history usually given is that first one teat goes wrong and then another. Occluded duct

is probably often a late expression of a localised form of catarrhal infection of the membrane and associated with the germ-carrying tendencies of the udder.

Some Clinical Features.

The recognition of the existence of disease in the udder of the cow is perhaps in the majority of cases easy enough, but where we attempt an ultimate diagnosis as to the actual form of the disease present we are dependent on the bacteriologist ; but this does or should not prevent us from trying to arrive at a strong presumption as to the particular kind of microbic invasion with which we have to deal in any particular case. Clinical suspicion must in the nature of things always precede laboratory diagnosis, because treatment should begin at once. In order to obtain a good clinical picture we should consider the probable portal of entry of the infection, but what is perhaps of more importance is a consideration of the stage of lactation, and to a smaller extent the breed of the cow. We thus have biological as well as bacteriological issues to be considered in mastitis, and these acting together determine a considerable variety of forms of clinical reaction. We may possibly pay too much attention to the bacteriological side of udder disease and too little to the biological. In most organs there would be some uniformity in the lesion produced by a given infection, but in the udder the type of reaction is largely determined by the stage of lactation. Every variety and stage of disease may be met with in the udder, from the mildest to the most severe ; it is therefore useful to have in one's eye a clinical classification of mastitis as well as an etiological or anatomical one.

Lymphatic Œdema of the Udder.

This condition may be regarded as a border line disease. It is most often seen in high-grade heifers or second calvers. Hall gives a very good description of these cases. It does not appear to be a bacterial disease, and is rather to be regarded as an index of the future milking capacities of the cow, since females with this form of swelling often prove good milkers. It was formerly described by Williams as an erythema, but the changes inducing the swelling are to be looked for in the deeper tissues rather than in the skin.

The quantity of milk secreted or to be drawn off is often reduced, but its quality is apparently unaltered, and this is the deciding factor in the diagnosis. It is this condition, often regarded by the laity as gathered, a caked udder, which has given a reputation to many nostrums pushed on the public as specifics for mastitis. The prognosis is good and the treatment is that for œdema in any other part, and massage is important. The great benefit of rubbing the udder in this state leads to abuse of the practice in active states of inflammation of the organ generally. The manifestation of the œdema at the commencement of lactation in certain cows is not to be wondered at when we consider the extraordinary provision which has to be made by the animal for carrying on a high grade and prolonged activity. It is probably associated with a want of harmony in maintaining the balance of the blood and lymph circulation at the commencement of new duties in an organ possessing an elastic capsule, but the actual cause of the œdema is uncertain. It is usually held that œdema is due to increased capillary pressure and filtration of fluid from the vessels as a consequence; but Professor Leonard Hill regards stagnation of flow and consequent deficient oxygenation of tissue as determining œdema through increased inhibition of fluid by the damaged cells of the part, with resulting swelling. And when the blood vessels rupture in this condition of the udder, or œdema develops, it is not because the blood pressure is high, but on account of inadequate support the vessels receive from the interstitial and protecting tissues or framework of the gland. When these latter tissues acquire sufficient tone the œdema disappears. The absence of a strong limiting white fibrous capsule to the mammary gland has already been alluded to, and it has an important bearing on the course of disease affecting the organ.

Lymphangitis or Cellulitis of the Udder.

In some of the more acute cases of mastitis occurring in recently calved cows a condition closely resembling lymphangitis, as seen in the horse, quickly develops, and it is the condition described above plus an infection. Inflammatory œdema in these cases tends to spread along the floor of the abdomen and posteriorly upward to the perineal regions. The swelling is firmer and more painful than that described as simple lymphatic œdema, and there are other signs of infection. This form of mastitis is often fatal, and, when not so, pursues a prolonged course and is then frequently associated with necrosis of one or more of the quarters of the gland. This condition of necrosis is to be distinguished clinically from acute gangrene of the udder, as it (the necrosis) usually involves the gland tissues only, the latter then resembling a huge infarct, which ultimately finds its way through the supporting tissues and skin and falls out, and the parts then heal. In this form of the disease there is inflammation not only of the gland (or glands) tissue generally, but the subcutaneous lymphatic plexus is also involved, constituting a sort of pan-mastitis. It is a condition which is responsible for much confusion in discussions on udder disease, especially in regard to amputation or excision of the mamma. Some practitioners would describe the mere removal of a piece of dead gland or tissue as an amputation, whereas they are simply assisting in completing a process of cure initiated by the tissues themselves. This, I think, accounts for the facility with which some men carry out an amputation of the udder, while the classical operation is a somewhat serious proceeding.

In this general condition the gland itself is surrounded by a zone or a ring of solid œdema which mechanically tends to hinder or retard movements of fluid or serum towards the central sinus. Thus, as it is difficult to re-draw fluid injected into the sinus and teat, amputation as above stated is useless, since apart from the hæmorrhage resulting from the wound only a little blood-stained serum comes through. We know that in such a case necrosis of

the gland is sure to take place, and that if the cow lingers on recovery with extrusion of the dead mass will sooner or later follow, but in many of them, however, it is seen that the patient is rapidly going downhill, and in perhaps two or three days is dead. The difficulties of treatment are great, and urgency is demanded. The controlling factor in relief is hæmorrhage. I have always felt that deep linear incisions to reduce tension and promote effusion of serum with its contained toxin were urgently demanded in these cases. In fact, what we require is to drain and relax the outlying tissues apart from merely draining the galactophorous sinus by teat incisions, since the latter are totally inadequate. A paper suggestive of this line of treatment appeared in the "Veterinary Journal" (May, 1917), by Mr. Ripley, of Hurst Green. He says: "As soon as diagnosis was certain, chiefly by noting the thin bloody fluid obtainable from the teat in conjunction with the general symptoms of septicæmia, some five or six deep narrow incisions were made into the udder substance by means of an abscess knife. These were about two inches deep but only large enough to madit the nozzle of a brass (pint) enema syringe. The wounds were then syringed three times a day with hypochlorous acid solution. Next day and in subsequent visits the punctures were enlarged, and eventually by joining one to another a long (six to seven inches) incision was formed." In three cases Mr. Ripley lost one through waiting, and two recovered under the treatment. The procedure is a rational one and offers better chances of success than an amputation of the whole mass of the udder with its attendant risks of shock and hæmorrhage. Even with these incisions gradually made, the loss of blood is often severe. Such incisions, in addition to relieving tension and promoting the escape of serum, assist the natural process of cure by facilitating the extrusion of the necrosed gland.

Heart and Circulation.

The state of the heart muscle in acute mastitis is of the utmost importance. There is a very close resemblance between pneumonia and mastitis in the probrous effects produced on the heart, in fulminating cases of either disease. The pulse and the heart sounds afford valuable information as to the degree of toxæmia existing. Irregularity of the heart is of very bad omen, and heart failure is also indicated by the rapid beats wherein the systolic and diastolic periods appear as if equal in length.

Significance of Rigors.

The initial rigors sometimes seem at the outset of an udder infection are often associated with chill, and may be of no great clinical importance; but the frequent occurrence of rigors during the course of a case of mastitis is of some consequence. In such cases they afford clinical evidence that bacteria or foreign proteins are entering the general circulation. They are often seen in acute cases of streptococcal udder disease.

Position and Attitude of Cow.

An easy change of position from standing to lying, and vice versa, is of good omen in mastitis. The maintenance of one position for long is usually disastrous, and in fatal cases cows obstinately stand, and when they once go down remain so.

Importance of Appetite.

The absence of a desire for food in some form or other is usually of grave import.

The Existence of Diarrhœa.

Constipation is frequently present in mastitis, and demands relief, but diarrhœa apart from that arising from the administration of purgative medicine is not of good augury, since it may indicate a grave form of toxæmia. It is said that streptococcal toxins are often eliminated largely by the bowel, that they have a strong cytolytic action, and that the bowel membrane becomes irritated in the process. We may see here an explanation of the supposed value of formalin when given internally in mastitis.

The Pyrexia.

The height of the temperature at the outset of an udder infection is no criterion as to the course or severity of the process. The temperature often falls by crisis at the end of the first day, but local tissue changes in the udder continue. I have seen a necrosed gland thrown out and the whole process occuring in the absence of fever. The condition of the heart is of more importance than the temperature in acute cases, a sub-normal temperature is grave. The temperature in all cases can only be considered in conjunction with the general symptoms. A continued high temperature may indicate pulmonary and valvular complications.

Wasting and Emaciation.

The loss of weight is to a great extent governed by the degree of toxæmia and pain. I have seen cows with a quite destructive lesion apparently suffering but little pain and maintaining a good condition of body, but as a rule there is much loss of weight in acute cases. In chronic forms of mastitis with a continued accumulation of pus in the sinus the animal usually fails to put on weight, although the material be drawn off once or twice daily. There may be little swelling of the gland, but a suppurating state of the mucous membrane exists and it becomes definitely chronic. There is usually in these cases a collection of small caseinous lumps or pea-like formations which act as foreign bodies and induce a continuous discharge of pus. Incision or excision of the teat is the remedy. After removal of these lumps and washing out of the cavity cows often put on condition and do well.

Lameness.

Lameness or stiffness in a hind leg is often the first indication of anything being wrong with the udder in fattening or dried cows. Lameness may be primary or secondary. The former may be caused by local irritation or referred pain and is often temporary. The latter or secondary lameness is often the result of blood contamination or metastasis. Here the joints are swollen, likewise the synovial sheaths. The pain is often severe and the condition of the patient may become distressing.

The Local Lesions.

The different manifestations of udder infection are almost bewildering in their variety, and a complete description of them would alone fill a long paper. One or two nodules may alone be existing somewhere in the gland; they are quiet and painless and remain so for long periods, and finally form the starting points of an acute process. We are not justified in assuming that in every acute case of mastitis the infection is a recent one. How often do we find evidence in udders, giving a full supply of milk, some points or areas of thickening, the direct result of a former arrested infection? Evidence accumulates that in many diseases organisms may linger on in the tissues, producing little irritation or otherwise giving evidence of their existence. Then something happens, a traumatism or chill, the body defences fail, and an acute process of infection is established in the part. And so we take a liberal view of the local lesions in mastitis and say that we may find them existing in any form or age; at one end of the scale there may be a mere nodule, at the other extensive death of tissue. A localised nodular condition of the udder may remain so for years without apparently affecting the milk supply, owing to the organism having been successfully immured by fibrous tissue, but such nodules must always be regarded as possible starting points of infection if for any reason the protective barrier is broken down. In other cases, with the development of nodules there is a progressing slow fibrositis, and a chronic mastitis even exists. An abstract of a paper on this form of mastitis appeared in 1906 in "The Journal of Comparative Pathology," by Irommndorff. The milk in many of these cases may not be much altered in appearance when drawn, but usually a great increase in the number of leucocytes is found, and such increase is generally associated with the presence of numerous streptococci. Irommndorff found that while milk from healthy cows contains from 5 c.c. or 1 c.c. per litre of leucocytes, there were present in the milk from such quarters anything from 2½ to 30 vols. per cent.

The Clinical Expression of Gangrene.

It promotes clarity of view if we restrict the term gangrenous mastitis to primary gangrene of the udder or that form of infection in which signs of impending death or gangrene are present from the earliest stage, in contra-distinction to that condition wherein necrosis of the gland or glands supervenes as a result of the severity of the infection. In the former death of tissue is obvious from the start; in the latter it is a late event. In the one gas is usually evident either in the discharges or in the tissue; in the other it may be absent throughout. The one is an anærobic invasion or infection; the other may result from the mere intensity of the pyogenic process.

In bovines generally, with the exception perhaps of that specific infection, black quarter, there is a strong tendency to the limitation of spread of gangrene and arrest of the process—an event quite rare in the horse. In primary gangrene, involving the teat and adjoining wall of the udder and accompanied by a grave toxæmia, prompt improvement often follows teat amputation or incision. I have seen cows in an almost dying condition and reeling, improve at once upon drainage; but in those cases in which the gas infection is a secondary one the termination is often fatal. In the latter instances isolated areas and gangrene may be seen in the udder widely separated from one another and exhibiting a tendency to coalesce. Necrosis of the gland may always be regarded as present when blood-stained serum only can be drawn down the teat, and that the quarter is then irrevocably lost.

Catastrophes and Flares.

The heading to this section of the paper is somewhat unusual, but it serves to direct attention to certain aspects of bovine mastitis. In attempting to relieve disease affecting a deep or buried organ, such as the liver or kidney, we are more or less in the dark as to the immediate or early results of the treatment, but in the mammary gland the success or failure of our methods are easily noted, and admit, in some degree, of measurement. This factor should long ago have definitely decided the value or otherwise of particular procedures, but such is the effect of tradition in matters medical, that we often keep doing a thing long after obvious objections and evident failures have been noted to occur from its adoption. In mastitis we see principles and practices rigidly adhered to throughout the whole domain of medicine, and surgery thrown overboard almost invariably, and especially so in the acute condition. A treatment catastrophe might be regarded as one where an animal becomes rapidly worse and dies as a result of the treatment adopted; and a flare as an instance of fever developing through the injudicious handling or dressing of a wounded part, such as a compound fracture or wounded foot. The mammary gland when diseased furnishes instances of both phases. Acute mastitis as we see it is essentially a battle fought out in the udder (field of action) between invading organisms (party of aggression) on the one hand and the defensive mechanism of the cow on the other. The defence is, as a rule, heavily handicapped by the presence of milk, etc., in the gland reservoir, in which fresh armies or reserves for attack may be continually formed, as has been already mentioned. When inflammation begins in the gland the defence may succeed in keeping the organisms well in hand and the process is mild; but otherwise a further attempt is made to wall them off or cut them out of the circulation, so to speak. The more common and dangerous forms of mastitis are those due to pyogenic cocci, and these organisms are highly chemiotactic and the phagocytes drawn to the part attack the invaders, and this forms the natural method of their destruction, and it is a process to be encouraged. By rough handling and injudicious rubbing of the diseased quarter a local reaction or infection may be converted into a septicæmia, a bacteræmia or gangrene, and yet probably 75 per cent. of cows the subject of mastitis are more or less exposed to such risks in the early stages of the disease. A cow when first observed to be affected may show little constitutional disturbance, and her case may be regarded lightly; the parts are fomented and rubbed three or four times daily, and perhaps in forty-eight hours or less she has passed

into a dying condition, or the general symptoms have become severe.

The following are illustrative cases :—

(1) A recently calved cow was seen one morning to have an enlarged quarter, but she was not otherwise seriously unwell. The owner, young and energetic, decided on a speedy one-day cure. He bathed, rubbed, frequently emptied the quarter and applied vigorously a caked udder cure. The swelling rapidly declined, the udder became small, cold and bluish looking. Death occurred about eighteen hours from the commencement of the treatment.

(2) The case was practically a duplicate of the above. Almost continuous bathing, rubbing in of oils, and death under twenty-four hours from a condition of shock septicæmia.

(3) Heifer, second calf, 21 days. Right hind quarter moderately swollen and milk watery. Appetite good and cudding. Treatment, bathing and rubbing with oils four times daily. In three days all quarters involved in gangrenous mastitis. One might extend such a list, but the cases cited will serve to illustrate what one may regard as catastrophes, but less serious effects are frequently determined in other instances, such as the udder troubles seen in fattening or lease cows. Mastitis occurring in the latter is very common in some seasons and rather troublesome to manage. A cow is seen perhaps to be looking rather hollow, inclined to remain apart from her company and to move sluggishly, but otherwise there is not much amiss. In two or three days she may be brought up for examination. One or more quarters are found to be hot, swollen and painful. In the sinus there is stinking milk curd and pus under tension. Some of the latter material is squeezed or drawn out through the teat, the parts fomented and oils vigorously rubbed all over the quarter. The following day the cow is often seriously ill. The temperature is high, respiration frequent, arterial tension raised, the appetite bad, and there are signs of multiple synovitis (joints and sesamoid sheaths swollen), often enough such a cow becomes a complete wreck. The retained or unabsorbed secretions in these fattening cows is harmless until putrefactive and other organisms begin to multiply in the sinus. When this takes place, an abscess often results. While forming, this sinus abscess is walled off by a zone of tissue (defence zone) rich in leucocytes, and the general constitutional effects are not severe. With the kind of treatment usually adopted in these cases of much rubbing, the wall of leucocytes or defence zone is broken up or disturbed, and virulent organisms gain access thereto, phagocytosis ceases, or becomes feeble, toxins and microbes find their way to the circulation, and general effects ensue as already described. The course of events above noted is very much akin to that which is sometimes seen after an incautious, or over zealous removal of an after-birth in a cow. In the latter case the damaged maternal cotyledons afford septic material the useful open door, and a general infection results, as expressed by joint or other troubles, the clinical picture here being very much like that seen in the udder septicæmia described above.

In treating an acutely inflamed and toxic organ there is no principle of treatment more firmly inculcated that that we should avoid further damage of tissue. We do not massage the lung in pneumonia or stir up a pleurisy or a peritonitis, but all these things are most religiously done in mastitis in the cow, and professional men, including myself, are sometimes accessory to the practice. One or two days' rubbing in of embrocation in a case of mastitis may mean a month's illness. How often one may see an increase of the general febrile condition shortly after such treatment. I have repeatedly seen rigors, a rise of temperature, pulse, and increased breathing, to follow the rubbing, so dear to the layman's heart, of a septic or acutely inflamed udder, and a series of temperature curves may be determined in a case in this way.

Treatment.

The treatment of bovine mastitis is on the whole unsatisfactory, and this is not to be wondered at considering the varied symptoms and the numerous etiological factors involved. In many diseases treatment is successful if life is preserved, but with mastitis treatment in the majority of cases to be completely satisfactory must not only preserve the life of the cow, but should in addition maintain or restore the integrity of the organ unimpaired, nor should the latter continue a carrier of infection.

The therapeutics of mastitis therefore present us with special problems ; the loss of one or more quarters in a non-pedigree ordinary stock-breeding cow may be a matter of no great moment, but with registered animals, and especially high-grade dairy cows, the preservation of the udder is of the greatest importance. Lord Rosebery said, at the time of the Fashoda incident, " that Egypt was the Nile and the Nile was Egypt," and so we may say here that the cow is the udder and the udder is the cow.

I doubt if much practical advance has been made in recent years in the management of the condition, and how often does the disease in the early stages come under the notice of the veterinary surgeon ? He is often consulted when " home measures " have failed or the cow has become seriously ill. Mastitis will never be dealt with in anything like a satisfactory manner until stock-owners fully realise its specific character, however caused, and that the cow herself or the defensive mechanism associated with her must perform the cure and not somebody's oils, or caked udder specific ; and perhaps we are not altogether free from blame in our failure to do some propaganda work in this direction. In fact one might regard the term mastitis as out-of-date from therapeutical and prophylactic points of view. What we term mastitis is merely an expression of the way the tissues are acting in order that they may rid themselves of obnoxious guests or invaders. It is a curative process, and we must look at the disease from an entirely different angle from that which we usually view it, and we can only assist in its cure by increasing the efficiency of the inflammatory process, and not by hindering or retarding it. All agents which promote a vigorous or aggressive phagocytosis and an increase of the bactericidal power of the serum

and tissues, and restrict the extent of the infected area, will be therefore helpful. "The surgeon's knife by cutting, the hot fomentations by softening, relieve tension and allow of increased flow of blood and lymph to the parts."—Professor Leonard Hill, Blood Vessels and Pressure. The relief of tension in mastitis is one of the most difficult problems we have to solve in severe cases of the affection, and the tension is of two kinds, or at least determined in two ways: the one by pressure directly caused by exudate, and the other the stretching of the suspending tissues and supplying blood-vessels, through sheer weight of the organ, and they are factors largely responsible for the necrosis which sometimes follows severe infections. Nearly all our measures for relief are futile in the presence of tension, and the overcoming of the latter is of the greatest importance.

We cannot say during the early stages of an udder infection what course it will run, since a highly pathogenic strain of organisms may be found invading tissues capable of high resistance, and, conversely, the opposite conditions may obtain; but we do know that once there is a general and deep infection, little can be done to restore the organ as far as our present knowledge and practice go. Mastitis, therefore, is always a condition to be taken seriously whenever met with and in whatever stage it may be. It is one, moreover, requiring to be dealt with before it has an established or definite morbid anatomy if the best results are to be obtained, since the greater the anatomical change the more pronounced has been the failure of the defence.

Tradition, dirt, lethargy, and the patent medicine vendor, are obstacles to successful therapy in bovine mastitis; liniments, ointments, draughts and drenches of all kinds become the order of the day, and no heed whatever is taken of nature's method of repelling bacterial invaders, nor is it sufficiently appreciated that all depressing and rough measures can only produce an effect comparable to that produced by an army advancing to the relief of a fortress, firing on the defenders by mistake.

The treatment of the disease, then, should aim at the destruction of the pathogenic organisms at the point or points of invasion, and before they have generally established themselves in the mammary tissues, and, failing this, the useful preservation of the life of the cow.

Prophylaxis.

When we know how to entirely prevent pneumonia in man we may equally succeed in preventing mastitis, but until then the disease will be with us more or less, its incidence being determined by factors which are both local and general. The isolation of affected cows, and not allowing their attendants to milk sound animals, should be obtained wherever possible; the practice sometimes adopted of milking diseased ones last being utterly unreliable where a strict prophylaxis is demanded. In large dairies the placing of new purchases in a sort of quarantine is to be advised, and this precaution could also be easily supplemented by an examination as to the leucocytic contents of the milk of new animals. In some of the outbreaks of contagious mastitis recorded as occurring in the country, the infecting cows were in the respective herds for some time before being suspected.

"The udders of newly-bought cows should be examined, and new purchases should be quarantined for some days. Although no milk is being secreted the gland may be infected, and cows with dry udders should therefore be strictly quarantined until after calving. In an affected herd two dry cows did not develop signs of the disease and were sold. Soon after calving in their new surroundings they became severely attacked."—P. Dubois, *J.C.P.T.*, 1904.

As to the value of an examination of the milk regarding its leucocytic contents, this seems established. Bergey first advanced the view that milk containing large numbers of leucocytes is probably infected with streptococci. There are two papers dealing with this subject in the *J.C.P.T.*, vol. 22, which should be consulted. "As an aid to veterinary inspections the number of leucocytes may furnish some information of value. If a dairy milk shows an unusually high leucocytic count a special examination of the herd for garget, etc., should be made."—Miller, vol. 22.

The elimination of all eruptive conditions from the teats and udders is of importance in the prophylaxis of mastitis or milk gland infection, and also the isolation of cows with septic wombs; in fact there must be sound skins and mucous surfaces, and the elimination of foci of infection in the body generally, the avoidance of errors of diet, particularly of damaged food, fly attack, and general cleanliness on the part of milkers, etc., in fact, good management and hygiene generally.

The Conferring of Immunity.

When udder infection begins to exhibit epizootic tendencies there would seem to be reason in some form of vaccination or serum treatment, but the routine vaccination of cows in order to prevent mastitis does not seem at present within the range of practical medicine.

Medical Treatment.

This is of considerable interest and importance and gives rise to rather marked differences of opinion.

The Use of Purgatives and Laxatives.

A fairly free action of the bowels is always to be desired, but excessive action is to be avoided and especially large doses of sulphate of magnesia. I have sometimes seen marked depression follow the latter. Free action of the intestinal canal hinders the reabsorption of excreted toxins, corrects food poisoning and relieves the liver and thus favours the body defences. In highly toxic states of the system, I am in favour of the introduction of large quantities of saline by means of the stomach tube, or the encouraging of the patient to drink water by using electuary containing sodium chloride. The passing of large amounts of fluids through the circulation is definitely recognised as a valuable means of removing toxins from the tissues.

Stimulants.

In the early stages and when chill is present stimulants are indicated. It is claimed by some prac-

titioners that it is possible to abort an attack of mastitis by the timely administration of a stimulant, and it is just possible that it might turn the scale in favour of the tissues at a critical point by overcoming chill and by sending an increased quantity of blood through the mammary gland; but it would be too much to claim that it had aborted an attack in such an instance. Ammonia salts and camphor seem of use for these purposes, and possibly alcohol might be given. At the outset of an infection of the udder, or when symptoms occur, I have obtained good effects from nuclein used hypodermically. At a later stage of the disease in severe cases stimulants are again indicated to help the flagging heart. In addition to the above, infusion of digitalis and strychnine may be used, the latter in small doses, and also adrenalin.

ANTIPYRETICS.

Used when the temperature is high but of doubtful value, if not of some harm, indeed, if we might adopt the modern view and regard fever as being bound up with immunity production, the febrile state would seem to be in certain cases of mastitis of definite use. "It is common knowledge that fever is likely to accompany inflammation, and, as in the case of inflammation, the efforts of physicians and healers of all sorts have been directed toward cutting it short on the idea that it in itself is the harmful process. Only in the last decade has it become vaguely appreciated that there is real evidence that fever, on the contrary, is a reaction elaborated to a considerable degree of perfection, which aids in the defence of the body against the advance of an injurious agent by facilitating the production of the substances which are formed in the body to neutralise poisons or kill bacteria. From this point of view it would seem, to say the least, short-sighted to give a patient in fever an antipyretic drug which will cut short the febrile reaction."—MacCullum, p. 158, Text Book of Pathology.

It is curious that in some of these cases with high temperature we give agents having a supposed antipyretic action, and at the same time put on heavy clothing and thus conserve heat, the two procedures being apparently in opposition to each other. When we require to definitely lower temperature I am in favour of the limited use of cold water sponging of the body; but the direct elimination of toxins, both local and general, and the relief of tension, are better means of lowering the temperature in mastitis than by giving antipyretics. When used, the disinfectant ones are perhaps of most value, such as quinine (highly spoken of by Mr. Adams, of Dursley) and salicylic acid and its salts. There would appear to be some reason for keeping cows warm when suffering from mastitis. Rolly and Meltzer, quoted by MacCullum, "Text Book of Pathology," have shown that animals kept at a high temperature produce agglutinins and bacteriolytic substances far more quickly and in much greater amount than in the control animals, a result to be aimed at in our treatment.

INTERNAL ANTISEPTICS AND DISINFECTANTS.

In recent years considerable interest has centred around the use of these agents in various diseases, especially in cattle practice. To-day formalin holds the field to the almost total exclusion of other agents in the treatment of mastitis. So far I have seen no very definite evidence of its value. In cases depending on or originating from intestinal toxæmia it would be indicated, and allusion has already been made to its possible value in streptococcal fever, wherein toxins are said to be largely eliminated by, and to have an injurious effect on the intestinal mucous area. Imrie, Lang, and others speak favourably of its use. It would appear that it should be given quite early in order to obtain the best results. It has occurred to me that one advantage of a more or less medical treatment in the early stage of mastitis, as opposed to a purely local one, is that little or no harm is done to the lesion (udder) by a too aggressive management, since the latter would upset the defence, and to which attention has already been directed.

LOCAL TREATMENT.

(1) *Intra-Mammary Injection.* Theoretically one would regard the injection of suitable fluids into the milk sinus as likely to yield the best results in the treatment of mastitis, but in practice the disappointments are numerous, and many practitioners regard injection as of little value, while with others we have exaggerated claims as to their utility. Bigoteau, "Journal Comparative Pathology and Therapeutics," 1910, described the results of the treatment of mastitis by injecting boric acid solution and claimed what seemed to me impossible results. He described the coagulation of the milk contained in the sinus as one of the first results of infection, and that all that is necessary to be done is to break up the clot and work it out with boric solution, squeezing out the pasty mass remaining, to which he attaches great importance. He says: "Failure to observe this very simple precaution has been the cause of most, if not all, the cases of non-success in treatment, and that all forms of mastitis in the cow are equally amenable to treatment with boric solution if my directions be carefully carried out." Such a view of mastitis is perfectly hopeless. Coagulation of the milk is not the first, but a somewhat late event in mastitis, and before it occurs there will have been already in existence an infection of the mucous tissues of the sinus, perhaps an extensive one, phagocytes will be crowding into the parts, and the defence will be in full swing.

Before we can hope to successfully treat mastitis in the cow by the injection of antiseptic solutions into the milk sinus, it is necessary for us to visualise, so to speak, what has actually occurred in the gland itself, such as the stage and character of the infection. To speak of infection of the parenchyma as existing in one case and not in another, and that it is absent when the milk has undergone gross chemical and physical changes—the result of bacterial growth in it—is contrary to what actually takes place in the udder. In mastitis we can think of the gland as we would think of a wound which has become infected; and to hold that it is possible to render it sterile or clinically sterile by a mere casual washing or injection of an antiseptic fluid is fatuous. "No surgeon has ever succeeded in procuring immediate sterilisation of

extensive infected areas of tissue by chemical means."—Makin's "Wounds in War."

It is, therefore, evident at the outset that the treatment of mastitis by injection must have but a limited application in practice. Much good will always be accomplished by washing out the sinus with non-irritating antiseptics, but to effect a cure something more is required. There most be prolonged contact of the tissues with an efficient antiseptic, and the latter should be one which, though non-irritating to the cells, must maintain its powers unimpaired for a length of time, and not losing its properties in the presence of albumin, etc. Moreover, such injections must be made early, or as soon as possible after indications of mastitis are noted, and during what we might term the tinkering stage of treatment as often carried out and usually before the case comes under the notice of the professional man. Some time since a veterinary surgeon stated that it was impracticable and unnecessary for owners to call in a professional man in every case of udder trouble. One might both agree and disagree with this view. To save the cow it would be unnecessary; to save the gland it might be highly desirable to do so. One might go further, and perhaps anticipate that, in the not distant future, cows which are found to be giving milk of a high leucocytic content will be treated by injection and vaccines before definite evidence of mastitis or tissue change has occurred in the udder.

The importance of a full consideration of intra-mammary injections in mastitis is so great that it might almost of itself form the subject for a paper and discussion, since apart from the use of vaccines or sera, it remains almost the only unexplored line along which we may advance in the immediate future. Of all the substances available for use, flavine or acriflavine seem to offer the greatest advantages, apart from the fact of its being rather an expensive drug. Quite recently (*Lancet*, May 20th, 1922) there appeared an article on "A Method of Treating Abscesses," by J. H. Kellock, F.R.C.S., in which the use of flavine was discussed. The arguments advanced are particularly applicable to this line of treatment in bovine mastitis. We will suppose that in a case of catarrhal mastitis, early stage, the contents of the sinus are drawn off and that tension is to some extent relieved and the walls of the cavity fall into folds, holding in their interstices multitudes of organisms, nothing being done at the time to prevent or hinder the spread of organisms from the infected walls into the surrounding tissues. The sinus immediately begins to fill again, and in a day or two the condition generally becomes distinctly worse and permanent damage to the quarter takes place. If instead, after drawing the sinus, the latter is washed out with boiled water or citrated solution, and when this has been withdrawn, we inject a solution of flavine (1-1,000), using a quantity sufficient to moderately distend the sinus, and let it remain, the fluid will be continually soaking into the walls, filling up any recesses and subjecting all the interior surfaces to the action of the antiseptic; if undisturbed the process will go on until the virtues of the antiseptic fluid are exhausted, whilst the number of organisms available to permeate the walls will be enormously reduced and the battle of the defending leucocytes rendered much more easy. "The patient's temperature falls gradually, for to a certain extent the tension in the original cavity has been maintained by the injected fluid. The cavity is at intervals filled to its utmost capacity with an antiseptic fluid which remains partially distending it and continually soaking the walls until they are rendered sterile. In all cases where the organism is found to be either a streptococcus or staphylococcus, flavine 1-1,000 is by far the best antiseptic, for it has the great advantage that when mixed with pus or serum it still retains powerful germicidal properties. It is of little or no use for Bacillus coli infections."—Kellock.

"Flavine is a reddish brown powder and produces staining of the tissues (1-1,000 or 2,000), controls and prevents the spread of sepsis, relieves pain and inflammatory œdema, and rapidly cleanses the part."—Bruce and Dilley, "Therapeutics."

Flavine would appear to have the qualities which we so much desire in an antiseptic for the control of infection present in the milk sinus, in the earlier stages of mastitis. It is best to repeat the injection every twelve hours for a day or two. Chinosol is of great value for this purpose also, and peroxide of hydrogen is used by some. In carrying out this treatment the udder tissue should be regarded, for the time being, as an abscess wall and handled with care. Hot fomentations and stimulating liniments may be helpful.

Local Applications and Support.

In cases with œdema great relief is afforded by arranging some form of support for the gland in the form of a suspensory bandage combined with moist heat. Much will depend on the skill and care of the attendant in employing these agents. I have already indicated that from my point of view a great deal of harm is often done by too much rubbing of the gland when in a state of acute inflammation, or recently infected, since by such methods we simply drive virulent organisms away from the udder into other parts and bring about disaster. The inflammation in acute mastitis is in no way comparable to that produced by a sprain, since traumatism plays no part in its production. Not until the virulence of the invading organisms has been greatly reduced are we justified in active manipulation, such as massage, etc., with a view to the dispersal of the swelling. This does not mean that the application of counter irritants to the gland is not to be employed, since in some cases such treatment is of value. When massaging the gland has been decided on, camphorated oil is useful. In a case of mastitis under observation some time since, a swab was taken on the tenth day and forwarded to a bacteriologist to be tested, and the report was, "No growth." Here we have the condition for active treatment of the udder by friction, etc.

Surgical Treatment.

Amputation or Excision of the Teat. (1) Most useful in many of the cases of mastitis seen in fattening cows, which are often forms of retention mastitis and already alluded to.

(2) Whenever the teat turns dark and becomes cold and bloody serum can be drawn down the duct, and perhaps a few bubbles of gas escaping at the same time.

(3) In spreading gangrene in addition to amputation of the teat, carry incisions on through the dying tissues.

(4) It is of no value in those cases which have been described under the heading of lymphangitis of the udder.

(5) In abscess of the sinus and some other conditions incision and excision of the teat should be tried.

Incision for Relief of Œdema and Tension. Should be tried in desperate cases as already mentioned under lymphangitis of the udder.

Separation of Necrosed Gland. Not to be confounded with amputation of the gland as sometimes happens. The dead parts should not be removed too precipitately, and vessels are to be divided between two ligatures, as hæmorrhage may be severe.

Ablation and Amputation of the Udder. There seems nothing to add here to the description in various text books and to the description of the operation given by Mr. Hall, of Barry, and reported in the *Veterinary Record*, February 25th, 1922.

Vaccine Therapy.

The estimation of the value of vaccine therapy is extremely difficult, since we must get rid of bias, for or against, and we should have some unanimity of view as to what constitutes a cure in mastitis. I am inclined to restrict the word "cure" to those cases wherein the gland, sooner or later, secretes marketable milk in quantities approaching its normal yield. I should not regard a gland as cured which continued to yield milk showing a high percentage of leucocytes and containing numerous streptococci. At present it would seem the cure of mastitis is only relative, and we are often content if we succeed in curing or relieving the cow herself, to say nothing of curing the udder. Sometimes a vaccine would be used to bring about one result and sometimes another, so that the subject becomes a very wide one, and much judgment is required in interpreting case endings.

I am of opinion that vaccines or phylacogens should be consistently used and "stock" ones are alone available for the early stages, and at the period where most good is likely to result from this line of treatment. With valuable cows autogenous vaccines may be had recourse to later. For the streptococci the infection of serum may also be employed. Vaccine and sera, however, can never be more than ancillary to other proved measures in whatever stage the infection may be, and most good will, I think, be found to follow the rational use of intra-mammary injections along with vaccines—the former attacking the organisms within the gland channels and on their walls, the latter helping the body defences from within; and the stage during which these systems of treatment are likely to be found of most value is that which, at the present day, may be regarded largely as the do-nothing useful one.

Many features of mastitis remain untouched, the matter being too vast for treatment in a single paper. If the subject has not been presented in an attractive form it may at least invoke discussion. The calls of a country practice, especially during the first six months of the year, render the writing of a paper for the "National" a most difficult matter, and continuity of work is impossible. This is expressed perhaps in repetition of statement and neglect of some important matters which might otherwise have been included. Taking a broad view of the subject, mastitis becomes a difficult disease to write about, for few organs and their diseases are more intimately associated with biology and bacteriology—comparatively new sciences. Much that is apparently contradictory emerges in regard to the sterility of the udder, and yet around this subject and immunity centres much that is interesting in any discussion on mastitis. Similarly, symbiosis (influence of the presence of one organism on the growth of another) becomes all important, and perhaps plays a part in starting some mammary infections.

Discussion.

Mr. H. Begg, who opened the discussion, said he felt some men desired, as he did, that congratulations should be offered to Mr. Harvey upon the very exhaustive and carefully thought out paper that he had produced on bovine mastitis, which was, he ventured to say, in its economical as well as in its medical aspects, one of the most baffling diseases that was encountered by the veterinary practitioner. Indeed, many practitioners in the North, that was to say in Scotland, had applied to it the epithet given by their national bard to toothache when he called it "the hell o' a' diseases." (Laughter.) Mr. Harvey's paper was pregnant with evidence of much careful thought and labour and the deep thought of an original mind, in fact the mind almost, he might say, of a dreamer, who dreamed to some purpose. Consequently, he had no doubt Mr. Harvey accepted his commission because he felt he had a special message to deliver, but he could well imagine that when he began in earnest to deal with a subject so huge, the multiplicity of its problems well might overwhelm him. The subject was obviously too large and its issues too obscure for them to hope for any real advancement in knowledge by any other than sectional treatment, and this, in his opinion, should be their future plan. When Mr. Harvey plainly stated that the difficulties attached to the solution of its many problems could only be determined by the development of team work carried out by a combination of practitioners and researchers he tacitly admitted what was true—that there was a prevailing absence of precision or finality in their present views regarding many important phases of the subject he was dealing with. In this view he heartily agreed. Indeed, so little could they read as yet of nature's infinite book of secrecy on the physiological and pathological problems of bovine mammæ, and so urgently was the subject looming up, that they could not afford much longer to delay this

organised team work if their advice on many public health questions was to be securely based on scientific facts instead of unstable theory and pious opinion, which was too often the case at the present moment. The field was definitely ripe for researchers, and the work should be state-aided. In opening that discussion, he might confine himself to a criticism, friendly or otherwise, of what Mr. Harvey had written, or with equal reason, since the subject was so large, make his remarks entirely supplementary to the paper. His task would be easier if he adopted a little of both methods, and if he chanced to go beyond the confines of the paper, he was not to be understood as cavilling with Mr. Harvey for having omitted to deal specially with those pet phases of his heart in which he was particularly interested. It was refreshing to find throughout the paper that a practitioner like Mr. Harvey had brought to his aid in making his deductions a well-grounded knowledge of physiology—that was evident throughout the whole paper. In talking of research the Chairman gave them a very pointed remark that they should not limit their conception of it to pathology and bacteriology and forget there was very much in nature they knew nothing about.

At the top of page 3, Mr. Harvey said the udder of the milch cow had to some extent become an abnormality—that the great development of the udder of the high grade, milk-record animal in size and capacity to yield milk so far exceeded nature's intention as to constitute an abnormality, but he went on to show that while other parenchymatous secreting glands possessed an unyielding white fibrous capsule which did not admit of any easy increase in size of a physiological character, the capsule of the udder was of yellow elastic tissue, which could so admirably accommodate the contained glands whatever might be the size which they attained physiologically. It was, in his opinion, a matter of taste whether the well-developed udder of the milk record cow was to be considered an abnormality, and he found it difficult to regard as abnormal, not to say freakish, any hyperdevelopment for which nature had made ample provision and accommodation. Certainly it was towards the higher development of the mammæ and a greater capacity in milk production that the efforts of all up-to-date breeders of milch stock of whatever breed were mainly directed. Much had been said and written of late by milk hygienists about the unfortunate nearness of the mammæ of the cow to the excreting effluents of the body, and its constant liability to soiling by alvine discharges; and they found Mr. Harvey saying the position of the udder as a food factory was bad, while he referred to others who would like to have it at the other end of the cow. What would they have? Could even the best dreamer among them better nature's plan? Was there any other position outside of the trunk where it would be less liable to accident or infection? Let them consider the almost absolute protection afforded the normal sized udder from traumatism in its natural position, how it was guarded, whatever the animal's attitude, by the broad, flat thighs supplemented by the draped precrural folds of skin, while the resiliency of the abdominal wall admitted without hurt the upward pressure of the organ when the cow was recumbent. Situated elsewhere, it would need to be pachydermatous, and if they must admit that the surface of the organ was readily soiled because of its position, any resulting evil was in great measure susceptible to control. He knew very well how easy it was to start or spread udder disease in a dairy herd wherever gross errors in procedure were practised, and how vulnerable the udder was to such ignorant or wilful mutilant measures, but let them think of the large number of dairy herds in which, year after year, no disease of the udder was found, and give nature her meed of praise for the excellence and simplicity of her design. It was somewhat arresting to be told that "the udder is uninfluenced by the compressive or expansive actions of the voluntary respiratory and visceral muscles so important in regulating the circulation generally"; and, though the statement held a modicum of truth, they could not forget that the circulation of the udder, as of the other organs, was maintained by the same heart whose tone and power were influenced by the factors mentioned.

On page 5, Mr. Harvey discussed to some extent in an academic fashion the processes involved in the course of an attack of mammitis, and though he omitted to adopt any distinct classification of type of the disease by means of which a student could form a differential diagnosis and estimate a prognosis, he would fain discard any that was based on the tissues involved, preferring rather to speak of them in terms of infection. However, on page 7 he did say that some value attached to anatomical qualifying terms. But, unfortunately for a bacterial classification, the clinical picture of different staphylococcal or streptococcal or even of bacillary infections varied materially, and in the course of general practice one found streptococci at work producing milk infections here and acute infections there, so that beyond the lead which it might afford for guidance in treatment by vaccine, it left quite unindicated the gravity of the infection. The terms "sub-acute," "acute," and "chronic" could not be lightly discarded, though they might be supplemented with very good reason, *e.g.*, to say a case was one of acute streptococcal parenchymatous mammitis indicated to the mind the gravity of the case, the type if not the strain of causal organism and the part of origin.

If they referred to page 6 they would see Mr. Harvey said as a fact that the milk while within the gland possessed the bactericidal properties of living tissue. Mr. Harvey almost tempted one to believe that the numberless bacteria multiplied almost not at all within the udder. It was well, however, to note that the researches of Lux and Stocking had clearly shown that there was a limited degree of multiplication in the udder. They had made six estimates of the bacterial content at intervals from the second hour to the twenty-fourth hour, and found an almost steady increase in the number of bacteria, which at the twenty-fourth hour were six times more than at the second hour. They all knew, of course, that when organismal virulence was high, any bactericidal power of milk continued in the udder was of no avail.

In the last sentence of the third paragraph on page 7 Mr. Harvey said: "It appears that organisms which have succeeded in passing the teat defences become attenuated." It had occurred to him in certain acute outbreaks that the virulence of the causal organism was for a certain time actually exalted.

In page 8, paragraph one, it was said "the precise form the mastitis will assume in a successful infection, and also its severity, will depend largely upon the stage of lactation, the virulence of the invading organisms, and the degree of immunity possessed by the cow towards the particular infection." He considered this statement was not complete in the absence of any reference to the efficacy of exposure to draughts, actual chill of the udder itself, etc., according as they were long continued or profound, in influencing the quality of the attack by their power to lower vitality and therefore tissue resistance against the bacterial onslaught. In this and the succeeding three pages they saw in his reference to staphylococcal, streptococcal and coli infections, Mr. Harvey quoting at length from Savage, McCallum, Adami and Sven Wall. He hoped they could intelligently follow theoretical descriptions of the battle royal that raged in the attacked udder, for, to put it mildly, there were many parts of the paper he could grasp with clearer comprehension.

Dealing with the primary anærobic infections: "Gangrene," Mr. Harvey's initial statement that in some instances it was obvious that gangrene was present from the commencement was in strict accord with his own experience. He could recall many such cases. The teat was tumefied, violet red in colour, turning soon to a greenish-black hue, with coldness of the part and peeling of the skin when the teat was handled. The stasis of circulation spread upwards, and meantime the cow was profoundly sick and septicæmic, and very often she died before the healthy tissue had had time to form a line of demarcation. When the teat was pressed a little dark red, evil-smelling fluid exuded, replete with a variety of organisms. He was at a loss to know whether this type of case was due to the *bacillus necrosis* or to a mixed infection of virulent organisms, and Mr. Harvey offered no opinion on the point. Most of his cases of this kind had died within a day and a half after the teat became lurid. Mr. Harvey said these cases were highly infectious; but while he would not dispute that statement, he thought it possible that, like himself, Mr. Harvey had treated them with such respect from a sanitary point of view that no other immediate case occurred as a result of careless handling. Mr. Harvey's allusion to the fact that "this form of gangrene sometimes follows udder inflation from milk fever where the syphon has been contaminated" led him to make comment that carelessness about the condition of the milk-fever syringe, and especially the teat tube, was undoubtedly responsible for far too much udder mischief appearing in cows that had been done. These sequelæ seriously reflected on the veterinary surgeon's scientific skill, and it would be well if cattle practitioners would carry with them not one, but several perfectly sweet tubes of various sizes to suit the capacity of different teat sphincters. Mr. Harvey said it was not always possible to separate pathological processes from purely etiological factors. That might be, but his greatest difficulty had always been to connect them. But since he admitted that bacteria were the direct cause of mastitis, he would suggest that the heading "Etiology" might have been used with good reason over his dissertation on the various types of causal organisms to which he had referred, while traumatism, chill and other factors might have been dealt with under the heading of "Indirect or complementary or predisposing causes."

Coming to page 14, "Flies as factors in propagation," he thought no reasonable doubt need be entertained that flies caused the infection in those midsummer cases of intractable mastitis that had been so common in grazing animals on the very hot days of the summers of the last decade. A dealer and grazier in his own district, who carried several hundred Irish cattle each summer in his fields, had had his *quota* of typical cases yearly for the past five or six years, and last year had fully thirty. Some of his grazing land, however, was close to a burning colliery bing, the sulphurous gases from which had a bleaching effect on the grass for a considerable distance, and he had never known a case to occur in these fields, the presumption being that the atmosphere around was almost inimical to the livelihood of the offending flies. As a prophylactic measure in the case of several valuable animals, he had used flexible collodion on the teats and udder surface, and such animals had escaped when many of their neighbours fell victims. Which fly was responsible? Was it a biting fly that infected by puncturing the skin of the teat or udder with its fouled proboscis, or a sucking one which, attracted by the waxy secretion on the teats, incidentally sowed virulent bacteria on their surface? The occurrence of these cases, in specially warm weather only, in virgin heifers as well as pregnant cows suggested a great exaltation in the virulence of the organisms which the flies might have brought from some putrid mass of organic material or carcase, the high temperature being favourable to their rapid development and pathogenic power, they seemed to be able to deliver their attack without the aid of any complementary vitiating factor, and the type of inflammation was so hyper-acute that those who had experienced it must never attempt treatment, but slaughter the affected animals for flesh at the earliest possible moment. It was significant that during this summer, with its low temperature, he had not heard of a single case in Lancashire. Protective inoculation was being tried, but he feared its efficacy would not be severely tested this year. He thought there was room here for the chemist's art to provide a sticky antiseptic dressing of repellant odour and flavour, that would not run with heat, for the udders and teats of grazing females. Cattle attendants should be instructed to burn every particle of putrefying organisms or material they found in or near to grazing land.

He was pleased to see the writer say that all cases were to be regarded as more or less infectious, but he did not seem to lay sufficient stress on the milkers' hands as a means of spreading mastitis. He was of opinion that if they could eliminate this factor, they would get rid of 90 per cent. of their cases, and from such a statement they would also readily infer that a greater percentage than this of their cases was occasioned through infection via the teat. He based his conclusions on the fact that in the great majority of the herds he attended the type in any given byre appeared to be almost constant. His experience, therefore, was that the symptoms, course, and results of cases of mastitis in a given herd maintained a fairly steady character. He had stated elsewhere that acuteness of attack and rapid infectivity went hand in hand, and the contrary was equally true. How often had they heard a stockowner say that he had little trouble in curing the cases in his herd by simply rubbing the quarter with whisky and black soap, or weak solution of mustard, or that by coating the quarter with treacle after fomenting with warm water, in three or four days the product of the quarter approached a normal appearance. But this success was difficult to understand by the neighbour who had a more acute type of infection in his herd, and whose efforts to cure his cases seemed to influence but little the course of each case.

Mr. Harvey had very properly drawn attention to the need for isolating cases of mammitis, however mild they might be. Not only so, but no milker of the healthy cows should be permitted to touch the udders of affected animals or dress infected sores of any animals on the farm. One could easily keep notes of the number of cases that occurred in any herd, but it was a more difficult problem to determine how many of the apparently healthy animals were already affected, that was to say, had the pathologic organisms already in the milk sinus, and although they might not yet have been able to overcome the resistance opposed to them, they were ever ready to deliver their attack so soon as the animal was subjected to some external ulterior influence which could lessen tissue resistance. He had had a manifold experience of this in back calving cows, which, though put out to grass in the spring at the end of lactation without known fault in milk production, would return to the byre in the autumn, and be found distinctly weak in one or more quarters, proving that while at grass, out of sight, the quarter that had become weak and had undergone some degree of catarrh, the result of the action of the milk secreting cells of the contaminated bacteria. The amount of damage done in such cases depended upon the virulence of the bacteria, and to a great extent on the efficiency of the drying off of the cow in the spring, for if some milk was still being secreted when the animal was turned out, it became a teeming culture, and the evidence of mammitis was not only well marked, but, if the animal's period of rest was short, the force of the infection might not be abated when she calved again, and the restoration re-activated the infection to a destructive mammitis. When the next period was sufficiently long to admit of exhausting of the infection in the quarter before the return of functional activity, the quarter might yield little or no milk at all, and, when the initial hyperæmia at parturition time had passed off, the quarter was found to be very much atrophied. Cows that suffered in this way, if brought in some days before calving, often exhibited some fulness of the affected quarter, though all tenderness might be gone, the fulness being due to the accumulation of more or less fluid material in the quarter. The fluid content of the quarter was the product of the activity caused by bacterial action, and those who had had much experience of udder tuberculosis would be able to recall the typical appearance of the tubercular quarter in a cow that had been dry for two or three months. While the healthy quarters were quite shrunken, the affected one was markedly enlarged. He thought that it was a good plan to begin to milk a quarter so affected every day, even before the animal calved. Dealing with "Foci of infection and infection by the blood stream," he could not conceive it possible for one infection by the blood stream to do less than infect the whole udder. Yet how seldom was it that they found more than one quarter affected at the onset of the disease. In view of Sir John McFadyean's notable finding, recorded in his classic paper on udder tuberculosis, that centrifugal tuberculous infection occurred in the udder *via* the lymph channels and against the stream, it might be conceived that other infections than tubercle also arrived at a single quarter of the udder by this route, but it seemed to him impossible to suspect the blood stream path except in the very rare cases of simultaneous infection in every quarter, and even then one would find it difficult to disregard the possibility of the entry of virulent organisms by all four teats at the same time when they had been bathed in a pool of alvine discharge lying on the floor when the cow was recumbent.

On page 18 they found useful remarks on retentive mastitis, but he thought some reference might have been made there to improper, incomplete milking as a factor in setting up mastitis. To leave some milk in an udder that contained pathogenic bacteria that were waiting their opportunity was to court trouble. He found it difficult to accept the suggestion that the parenteral digestion from the udder of a fairly large quantity of milk, over a period of time, might throw a cow into a state of anaphylaxis, since a cow's own milk could not be considered foreign albuminous material. It was accepted that anaphylaxis was the development under certain circumstances in an animal of hyper-sensitiveness to foreign albuminoids, materials which in themselves were non-toxic. He passed the chapter on lymphatic œdema with the remark that the topical term applied in Scotland to this physiological condition of the parturient animal was "swaum," "swaumy." Bacterial infection of the udder while it was in this œdematous state was dealt with in the next chapter, and he had seen such cases in which the teat and a large part of the infected quarter were deprived of blood supply through thrombosis, and were cast off without giving rise to serious

ill-health. The cavity left granulated profusely, and from the hollow a number of bleeding fingers of highly vascular tissue hung down. In the centre of each finger there was a blood vessel that had maintained its vitality, and the thickness of the finger was due to the growth of granulation tissue around the walls. When these had been ligatured and removed the part soon healed up. Though Mr. Harvey made no use of the term "symptoms," so full of meaning, he rehearsed chief symptoms under different headings. He had always looked on lameness in the early stage of mastitis as a bad omen. The secondary metastatic lameness that occurred while pus formation was proceeding in the udder was in every particular analogous to that which accompanied some cases of suppurative metritis. On page 28 they found something new in headings, viz.: "Catastrophes and Flares," under which Mr. Harvey dealt with some of the results of irrational treatment, chiefly of acute cases of mastitis. When the treatment was so meddlesome and irrational that it directly caused fever, the term "flare" was used, and when death resulted the term "catastrophe." The three cases cited to illustrate catastrophes were rather remarkable in their results. They presumed that they had no elements of a case of gangrene, and that the rubbing to which the udders were subjected was so vigorous that the inflamed tissues, after being softened by fomentations, were so cruelly massaged that they were bruised beyond repair, and that the attendant had actually produced traumatism. He supposed it was not expected they should believe that judicious fomentation and gentle and oft-repeated massage, using effleuvage movements, was detrimental to the progress of a case of mastitis After bathing and massage the udder should be covered to prevent radiation of heat from it, and care should be taken that the tender organ did not he in contact with the cold floor. Cataplasma kaolin at suitable temperature might be spread on the affected quarter, and a layer of cotton wool stuck on to it. A mixture of lard, tallow and wax might be used as a protective, and he had often seen treacle used with the best results.

He thought they all agreed that the treatment of bovine mastitis was on the whole unsatisfactory, and the statement had almost become classic that "whatever the causal factor of mastitis, the treatment remains the same." Nor could he imagine any discovery in curative treatment that could have the effect, at the time they were usually called to a case, of completely restoring the integrity of the delicate milk-secreting cells of a quarter that had been for a few hours the seat of acute inflammation. Fortunately, the great majority of even acute cases were confined to one quarter, and since it was to be regarded as almost, if not completely, lost as a future milk producer, their best efforts must be devoted to limiting as far as possible the baneful influence of the diseased process on the general health of the cow. Under "Prophylaxis," Mr. Harvey gave full details of the necessary sanitary measures, and he had alluded to some of them. But how difficult it was to have them carried out in practice. In the great majority of steadings there was no hospital byre, and they saw whole herds of 50 or 60 cows kept under one roof. For every herd of 60 there should be four byres, if possible prevention of infectious disease was to have any chance of success. He need not say that the call for these changes in his clients' premises should proceed from the members of their profession. With regard to "the conferring of immunity," he felt certain that if he were now called to deal with a herd in which acute, rapidly spread mastitis occurred akin to outbreaks he had experienced on nine or ten occasions, he should make use of a dead vaccine prepared from one of the cases. He did not think that vaccine therapy was likely to have any wide application for the cure of mastitis. He tried it with success recently in a mild staphylococcocal infection of all four quarters. Within four days she was cured.

He thanked Mr. Harvey for having produced such an excellent paper. Few country practitioners had looked into the question so deeply. They were honoured in having a man of such a type to tackle these problems for them.

Mr. H. TUDOR HUGHES said they were greatly indebted to Mr. Harvey for the profound learning he had brought to bear on the subject of his paper. Mr. Begg had covered most of the ground, so it was difficult to pick up other points for consideration. Regarding the matter of flies, it distinctly showed that it was a seasonal occurrence in most practices. He was rather struck with Mr. Harvey's remarks on lymphatics. He did not think they got much change without the gland tissue itself being involved, but it was a strange thing how rarely lymphatic glands were involved without suppurative changes. In some cases, where the stoppage seemed to be near the apex of the teat, he had managed to open it up with favourable results, but he did not like to interfere if it were at the base. He made it a rule to ask for a tumbler in order to draw off some of the secretion to examine its colour, quality, smell, etc. In cases of gangrene there was a characteristic odour, a sickly, rather sweetish, odour that hung about. In 24 hours they would find in such a case the cow exhibiting all the symptoms of gangrene. If cows were killed in the early stages, surely it was questionable whether the carcases would be fit for meat. Was it not advisable to lower the temperature, to encourage a cow to have something to eat to keep up the power of resistance? He thought it was going to be a very difficult matter to keep owners from resorting to some local treatment or other. There it was before their eyes. They thought something must be done. It was better to put them on a likely method of treatment rather than tell them to leave the animal alone, which one felt practically certain they would not do.

Mr. COLEMAN (Swindon) spoke of an experience where some cows contracted a form of mastitis last summer. The whole herd was vaccinated with good results. How long it would last he could not say. In young beasts, swelling of the hind legs occurred.

He might add that in none of these cases did gangrene occur.

Mr. W. J. YOUNG said that being a practitioner of preventive medicine, he felt it his duty to discuss this subject. He attended a conference at Leeds where the leucocytic content of milk was considered, and the writer of the paper, Mr. De Vine, said that he would condemn a sample of milk if he found leucocytes. If that were done, the public would get very little milk. There was a test known as the Brom-cresol test. It was a very useful test. When the milk contained leucocytes or streptococci it gave a deep blue colour. It was regrettable to him that so little was taught in the veterinary colleges concerning milk and milk production. It was his honour and privilege for some time to examine students in pathology, and he found if he asked them questions about organisms found in the mammary gland, the students got out of their depths, and he had reluctantly to forego following up that line of thought. He must say that the courses of the agricultural colleges on bacteria were of a higher standard than in any of the veterinary colleges he knew. They went deeper into the bacteriology of milk. He thought it as regrettable that chemistry as applied to pathology was neglected. This paper had given him a fillip to continue to plough his lonely furrow in the field of chemical pathology. He believed chemistry was going to come into its own, and that a tremendous part of the advancement of veterinary science would depend on their knowledge of chemistry. He would like any member who used the Brom-cresol test to give the Association the benefit of his experience. Government grants had been made to carry out investigations.

Mr. S. J. MOTTON said that the mammary gland might be unnecessary for the continuance of life, but it was of immense importance to the continuation of the particular race of animals. It seemed that the gland must be placed outside for proper accessibility.

Mr. A. W. N. PILLERS produced examples of the Brom-cresol test and said he must say he thought it was in general use.

Mr. GOOCH said he could not agree with Mr. Hughes when he said he opened up a teat when the trouble was at the apex. He had come to the conclusion it was better to let it alone. He found that no matter what one used to sterilise, the moment one started to open up, one set up disease or a condition worse than what one found. With regard to using the knife in the case of gangrene, he would not hesitate for one moment in getting drainage as quickly as possible. Regarding retention of milk, he agreed with Mr. Begg that with a bad milker he should expect a far greater number of cases than with a good milker. He alluded to the enormous wastage in a short time in the case of gangrenous animals. In the course of 24 hours one found the carcase had wasted to an enormous extent, more particularly than with any other disease. As to treatment, the first consideration was to save the life of the udder. The great drawback was they were not consulted in sufficient time. They got very little use from any injection except in the very early stages—when they very seldom saw these cases.

Professor MACQUEEN, in the course of a characteristic contribution, said he had a great regard for Mr. Harvey, but he could not say that his paper appealed to him as a first-class one. Perhaps they would allow him to refer to where it might have been improved. (Laughter.) Mr. Harvey mixed up the clinical features of the disease with the bacteriological and the pathological, and although he began his paper with a sort of apology for the obscurity of mastitis, instead of clearing the ground he made confusion worse confounded. On page 5, he said " the discussion of the pathology of mastitis must be left to the trained worker in comparative pathology." If he had kept that as his text and confined his attention to the clinical side of the disease, it would have been very much better. On the other hand, if he had pursued the pathological investigation of the disease and stuck to that alone, his paper would have been much more acceptable. He had one or two questions he would like to ask Mr. Harvey, so that he might have an opportunity to reply. They must understand he was not excluding the paper entirely. He should like Mr. Harvey to tell them whether he regarded mastitis as always contagious, or did he consider there was a non-contagious form and one or two contagious forms ? There was a further question he should like to ask : Mr. Harvey stated in his paper at one point that milk was bactericidal, and in a later page spoke of milk as being a very suitable medium for the cultivation of bacteria. How did he reconcile the two statements ? He wished also to enquire what was his actual opinion as to the intermammary injection ? Did he believe that any intermammary injection could be introduced in sufficient quantity to effect any influence on the disease ? and, if so, what injection would he prefer ? Did Mr. Harvey recognise a form of mastitis called streptococcic ? and, if so, did he consider that was a contagious disease ? Had acute mastitis any constitutional origin or any connection with constitutional causes ? The paper was comprehensive, but owing to that fact it was more or less obscuring ; but if parts had been deleted, it would have been a very excellent paper.

Mr. W. R. DAVIS (Enfield) said the most important point to consider in mastitis was that of causation, and he could not accept the statement that every case came from local infection. He was perfectly satisfied that a great number of cases came from the body. Frequently they found cases in animals exposed to chills and to exhaustion after a long railway journey. Regarding treatment, his impression was that injections were in a great majority of cases of very little service.

THE REPLY.

Mr. HARVEY, in replying, thanked them for the very kindly way they had received his paper. One had to deal with a few points, and it occurred to him that he could do best by discussing certain things, fundamental things. Mr. Begg had alluded to the uniformity of attacks which had occurred when mastitis broke out in a herd, and the first cases were found to

be more susceptible to it. That was the case of the susceptible animals in all outbreaks. He thought it was a good suggestion of Mr. Begg's that they should carry many syphons, and not limit themselves to one or two. He was certain there was a danger of conveying germs through injections from one quarter to another. He quite agreed that milkers' hands were very important in transmitting disease. He had alluded to the fact that a cow which was easy to milk was the one most easily infected. One speaker had also referred to injections. When the disease was well established he did not think they were any use whatever. In his view the only time when injections were of use was in the earliest stage before one got any striking change, any profound change, in the udder. Professor MacQueen had asked him some questions. He was very pleased with his remarks. He liked criticism, and he regarded his remarks as more or less friendly. He was not alarmed at what he had said. He was rather surprised that a gentleman of his experience should hold such antiquated notions with regard to etiology. What he said, or would like to say, was that every case of mastitis, no matter how it started, must be regarded as infected. It was possibly through germs under certain conditions from other animals. Every disease, most of them at any rate, were due to germs. It was begging the question to say that they were due to constitutional causes altogether and not to germs. He had emphasised in the paper the importance of chill, etc., which lowered immunity. There was nothing contrary in his statement regarding bacteria; the two things were in accord, notwithstanding Professor MacQueen's doubt in regard to it. The whole question of mastitis was very difficult, and the further he went into it the greater the difficulty seemed to be, owing to the varying conditions. When the veterinary surgeon was called in, it was practically too late to do very much. He hoped his small contribution to the subject might start other inquiries. There should be a Committee of the Association reporting on the udder diseases for the general benefit of the members. He was not at all pleased with the present results and treatment of mastitis, and he hoped many of them would supplement them in regard to treatment. He always believed that the flow of inflammatory material should be outward, and he did not object to a certain amount of treatment. What he objected to was rubbing, that risked driving the material back into the system.

OBITUARY.

Mr. F. W. Garnett, of Windermere.

SUDDEN DEATH WHILST ENGAGED ON SCIENTIFIC RESEARCH.

It was with great sorrow, says the *Westmorland Gazette*, that the inhabitants of the Lake District heard of the sudden death on Tuesday, August 22nd, of Mr. Frank Walls Garnett, of Dalegarth, Windermere. Mr. Garnett had been out walking the previous evening and remained up, after the household had retired, to complete some research work upon which he was engaged. During this work he had a seizure, and passed away with tragic suddenness. The shock was a very severe one to his family and relations, and indeed came with a blow to the whole neighbourhood, as Mr. Garnett seemed the impersonation of health, strength, and activity. It was impossible to associate indisposition with a man of such tireless energy and apparently sound physique. Born 56 years ago at Fairfield, Windermere, he was the youngest son of the late William and Frances Garnett. He was delicate as a child, but gained strength in the salubrious air of St. Bees, where he was educated in his early days at the Grammar School. Here he already evinced an interest in and a love of nature and animals, and that branch of research work which was developed in his subsequent career at the Royal College of Veterinary Surgeons. After taking his degree he returned to the Lakes and had an extensive veterinary surgeon's practice, and soon established himself as one of the chief authorities in the county in his profession. When Mr. Garnett was at the full tide of his veterinary work the Lake District had risen to its highest point in horse traffic. During that period his services were in great demand all over the Lake District, often in several places at the same time, but his boundless energy, and the enthusiasm he felt in his profession, seldom let him disappoint a client. When war broke out he gave up practising as a veterinary surgeon, and his useful powers were at once directed into various channels for the benefit of his fellow countrymen. His work on behalf of the War Office in all matters appertaining to horses and agriculture, and his energy in raising volunteers for the Services, are too recent to be easily forgotten. He was already connected with the scheme for developing technical training in agriculture in the joint counties, and his advice was sought in high circles on similar matters during the stress of the war. The deceased was a member of the Windermere War Relief Committee, and was a member of the Ministry of Pensions for Cumberland and Westmorland. He was a member of the Education Grants Committee, this work necessitating a considerable period with the Fifth Army in France in 1919, and very hard work in London for more than a year, the object being the training of officers and men in order that they might take up their duties again in civil life with as little delay and loss as possible. Amongst other offices he held were those of urban councillor for Bowness (being made chairman in 1897). He was placed on the Commission of the Peace for the county on January 6th, 1905, and served with zeal and justice till the end, being generally regarded as one of the most capable magistrates on the Bench. He was president of the Royal College of Veterinary Surgeons from 1914 to 1919, and for his services in this connection during the war was awarded the C.B.E. He was hon. secretary of the Fell Pony Society, was a member of the Polo and Riding Pony Society, was on the Income Tax Assessment Committee, and was appointed on the Royal Commission to enquire into foot-and-mouth disease, in connection with which work he was quite recently in Glasgow. He was very interested in parasitology and ornithology. He invented a very useful microscopic photographic instrument for the examination of microbes, which proved of assistance to science generally. His valuable contribution to the Victorian series of books is well known. Arising out of this, and from the vast volume of material which he had collected in his researches, arose one of the most interesting books which has been produced in Westmorland. "Westmorland Agriculture, 1800-1900," is something more than its name indicates. A huge volume, beautifully got up and illustrated with a collection of photos and pictures of which a moiety would be considered generous for a present-day publication, it deals with agriculture in every phase from the fell land to the flat meadows of South Westmorland, it contains information on the study of animal life of every kind, and it touches on nearly every subject which is of interest to the dweller in the Lakes. Labour and hirings, land holdings, tithes and other customs, our county roads, agricultural societies, and kindred matters are dealt with

in a masterly style. The beautiful illustrations of prize-winning sheep, champion sheep trial dogs, sheep clippings, huntsmen, and so on, show his sympathies and leanings towards the sporting life of the county. In this connection it might be mentioned that he was a keen fisherman, and was very fond of encouraging athletics.

He was president of the Bowness Bowling Club, which he kept provided with a challenge cup. As regards educational problems, schoolmasters and pupils alike testify to the efficiency of his chairmanship of the school managers in the whole of the Windermere Urban District. In politics he was a Liberal, and was connected with the North Westmorland Association, but, though he was essentially a man who had the courage of his convictions on every subject to which he gave thought, he never was obtrusive with those opinions, and held the respect of his political opponents as he did the affection of all who knew him intimately. He married Miss Susannah Goddard, of The Priory, Hampstead, who survives him, together with one daughter, Marjory, and one son, Dr. Donald G. Garnett, and for them as well as the other bereaved relatives general sympathy is felt. The remains were conveyed to Liverpool for cremation.

Mr. William Anderson, Tarland.

We regret, says *The Aberdeen Journal*, to announce the death of Mr. William Anderson, M.R.C.V.S., farmer and veterinary surgeon, Titaboutie, Coull, Tarland, which took place on August 28th.

Mr. Anderson, who was over 80 years of age, was the second son of the late Mr. John Anderson, farmer, Old Bourtie and Longfolds, near Inverarie. He worked on his father's farm until he was 26 years of age. He then went to the Royal (Dick) Veterinary College, Edinburgh, where he graduated with distinction. He afterwards succeeded the late Mr. Robert Sorley, veterinary surgeon, in Alford, where he enjoyed a very lucrative practice for 22 years. During these years he married the eldest daughter of the late Mr. John Anderson, farmer, Kinstair, Alford. His wife, being a farmer's daughter, was anxious he should take a farm and retire from the practice. The farm of Titaboutie, a holding on Lord Aberdeen's Cromar estate, came into the market, when Mr. Anderson was preferred as the tenant. This farm was then in a very exhausted condition. Consequently, Mr. Anderson had to spend a good deal of money upon it.

The deceased gentleman was for many years a very successful exhibitor of seeds and roots at Tarland and Torphins shows, where he carried off many of the leading prizes. He was also a breeder of polled cattle. His bull calves always commanded a fair price at the spring sales, and several for exportation at long prices. Never forced by feeding, his bulls always turned out well to the buyers.

Mr. Anderson also purchased several Clydesdale pedigreed mares to form the beginning of a Clydesdale stud from which he intended to breed.

Mr. Anderson declined to take any part in public work, preferring to devote his whole time to the veterinary profession and the cultivation of his farm. The former he intended to give up when he took the farm of Titaboutie, but, owing to the pressure brought upon him to continue his practice, he did so until declining years compelled him to retire. As a castrator he had few equals, as for 47 years he never lost an animal by the operation.

He was for many years an elder in the Established Church, and was in 1912 and 1914 elected representative elder to the General Assembly by the Kincardine O'Neil Presbytery.

Mr. Anderson was predeceased by his wife and daughter, but is survived by four sons.

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